

# BULLETIN

PSD #: 591  
APC #: 474,482  
DEADLINE: 2/01/88

## *PRODUCT SERVICES - Schaumburg*

Date: January, 1987

Memo To: Area Service Managers

cc: Area Field Technical Representatives  
Motorola Hi-Tech Center  
NSO School

From: Jim Langerman

Subject: MSR2000 and MSF5000 Ferro Resonant power supplies,  
TPN1185A, TPN1218A, TPN1184A, TPN1192A, TPN1226A, TPN1227A

If the above listed power supplies are used in areas susceptible to line frequency variations in excess of 5%, they may exhibit a lock-up problem where the supplies revert to the battery back-up mode, which can only be reset by removal of the AC line cord.

If this phenomenon occurs replacement of the following kits is necessary.

FOR APC 474 - The battery Charger board (TPN6137B or TRN 5966A)  
(MSF5000) should be changed to a TPN6137C.

FOR APC 482 - Both the Battery Charger board (TPN6137B, TRN9007A,  
(MSR2000) or TRN6155A) and the Aux. Regulator board (TRN5119A)  
must be changed to TPN6137C and TRN5119B respectively.

Please contact Product Services - Schaumburg for the necessary replacement kits. Labor will be accepted with a maximum of 2 hours plus travel by referencing this PSD#. Where possible, please try to incorporate this fix during routine maintenance.



SECRET

DATE: 11/10/54  
PAGE: 1

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# Product Services Bulletin

PSD #548  
APC #425  
DEADLINE DATE: N/A

JULY, 1985

MEMO TO: Area Service Manager

CC: Area Field Technical Representatives  
NSO School

FROM: Jim Bellizio

SUBJECT: Secure Communications Base Station Equipment, Coded  
Deviation Adjustment Information

Several inputs have been received regarding problems encountered in the measurement and setting of proper transmit coded deviation levels on Secure Communications Base Station equipment. To aid field and customer technical personnel, the Schaumburg Product Services Group issued Service Repair Note SRN-1027. This document should be referred to when making any coded deviation measurements on Secure Communications equipment.

## NOTE

Any adjustments to the clear mode deviation control (IDC), will affect the coded deviation level. Set the IDC to the proper level in the clear mode prior to adjusting coded deviation.

If the coded deviation level requires readjustment, the following procedures should be used.

For stations containing the TLN5973A Code Processor Module:

Locate R55A/B and R47A/B on the module schematic. These parallel resistor pairs are initial factory build values. Either of the "B" values may have been removed, or the values of the "A" resistors may have been changed to adjust for proper coded levels. Removal of R55B increases the coded deviation approximately +/- 400Hz. Removal of R47B decreases the deviation similarly. Fine adjustments can be made by selecting a value, or parallel value for R55, that sets the deviation for a proper level of +/- 3.7KHz to 4.3KHz.

(over)







For stations containing the QLN2194B Duplex Code Processor Module:

Refer to the module schematic diagram, the schematic diagram is separated into two sections, the QRN8639A main board is used to process repeat transmit coded audio and receive coded line data, and the QRN8640A auxiliary board for processing transmit line coded audio. The coded audio for repeat and the transmit line coded audio require separate deviation adjustments.

Locate R55A/B and R300A/B on the main board schematic. These parallel resistor pairs are initial factory build values. Either of the "B" values may have been removed, or the values of the "A" resistors may have been changed to adjust for proper coded levels. Removal of R55B increases the coded deviation approximately +/- 400Hz. Removal of R300B decreases the deviation similarly. Fine adjustments can be made by selecting a value, or parallel value for R55, that sets the deviation for a proper level of +/- 3.7KHz to 4.3KHz.

The above information allows for adjustment of the repeater coded audio. Line coded deviation may be adjusted by the same procedure, selecting resistor values for corresponding resistors R23A/B and R25A/B on the QLN8640A auxiliary board.

This is a service aid bulletin for information purposes only. No warranty costs are implied or intended.



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**MOTOROLA INC.**

PSD F-311  
APC 527

DEADLINE DATE: February 28, 1986

MEMO TO: PSD Distribution

DATE: August 28, 1985

FROM: Greg Sadler

SUBJECT: Security Consoles P1050C, P1143B and P1162B

For the above listed security consoles manufactured between June 1983 and July 1985, the auxiliary back-up dc supply which consists of one to five nickel-cadmium batteries may in fact have the wrong model batteries installed. If this is the case, no damage would occur but the console will not operate properly when AC power is lost or disconnected.

The incorrect battery model number is NLN4463B (yellow in color) and the correct battery is the NLN6761A (blue in color). This can be easily checked visually from the rear of the console. The problem is that the NLN4463B battery has a terminal arrangement that doesn't properly align with the charging contacts on the above-mentioned models.

Please check your consoles and if the wrong batteries are present, contact your area C. & E. Parts Department for warranty replacements. This bulletin neither offers or implies any warranty labor consideration.

Greg Sadler  
Product Services,  
Plantation

GS/bjg







# BULLETIN

PSD # 572

APC # 277

DEADLINE: 6 30 87

## PRODUCT SERVICES - Schaumburg

Date: July 1986

Memo To: Area Service Managers

cc: Area Field Technical Representatives  
Motorola Hi-Tech Center  
NSO School

From: Don Lobdell

Subject: TRUNKED SYSTEM ALIGNMENT FOR DUPLEX INTERCONNECT

Field inputs have been received concerning low Transmit and Receive audio levels in Trunked Duplex Interconnect operation, as well as marginal performance in poor signal areas. Engineering investigation into these complaints has resulted in a set of attached Alignment Procedures. Implementation of these procedures on Test Systems has resulted in significant improvement in interconnect audio quality, and are recommended for implementation when duplex mobiles are added to a Trunked System.

The attached procedure covers the Alignment of the TRIB board, and the Micor repeater audio alignment procedure.

### Alignment Time Allowed Under Warranty

- 1/2 hour for 1st Repeater
- 1/4 hour for each additional repeater
- 2 hours for each TRIB Board

The claim must be submitted on the standard RO-19-21 form referencing this bulletin.

Both a Recommended and an Alternate Procedure for TRIB alignment are included. Use of the Primary Procedure is recommended, but the unavailability of the AM modulated function generator may make this impossible. The Alternate Procedure has been used with an almost equal level of success, but does not allow one of the levels to be adjusted.

CAREFUL ATTENTION TO THE EXACT DETAIL OF THE PROCEDURES IS NECESSARY, WITHOUT SHORTCUT OR SUBSTITUTION IN ORDER TO ACHIEVE SATISFACTORY RESULTS.

Technical assistance for Trunked Centrals and implementation of the procedure is available through the Midwest Hi-Tech Service Center. (312-576-7300)

### ATTACHMENTS:

Test Equipment List  
Trunked Repeater Alignment  
TRIB Alignment

Page 1  
Page 3 - 5  
Page 6 - 13







### EQUIPMENT LIST

- 1.) HP 4935A Transmission Test Set
- 2.) HP 331A Distortion Analyzer (analog a-c voltmeter)
- 3.) Fluke 8060 Multimeter
- 4.) Tektronix 465B oscilloscope
- 5.) Wavetek Model 148 AM/FM/PM Function Generator  
( + series 560 ohm resistor results in 600 ohm source)
- 6.) TEN 6081A Card Extender
- 7.) MLN1042A test cables (MK871GS - one cable)
- 8.) 560 ohm 5% 1/2 watt resistor 06-00125A43 (source)

### ALTERNATE EQUIPMENT

- 1.) High impedance a-c voltmeter: Motorola S1053 or Equivalent
- 2.) Audio oscillator: Motorola S1067 or equivalent

Note: a 560 ohm resistor in series with this generator  
will give the desired source impedance of 600 ohms.

- 3.) R2001 or R2200 Service Monitor:

Note: the audio modulation output port with a series 560  
ohm resistor results in the desired 600 audio source.

- 4.) R1100 code synthesizer see attachment for set-up.
- 5.) HP TRIPACK 353 A

Contact your phone company to obtain the phone number of a quiet terminated line for the tune-up procedure. When a duplex radio is used to call this number during the tuneup, the duplex radio must be turned off (power down) after the connection to the quiet line is made, during Hybrid balancing, in order to reduce noise pickup.





## ALTERNATE EQUIPMENT AND SET-UP

### NEEDED EQUIPMENT:

1. R1100 Code Synthesizer
2. HP tripack

### SET UP THE EQUIPMENT AS FOLLOWS:

1. Connect a BNC to BNC cable to the output of the Motorola Code Synthesizer and to the OSC input of the tripack 353A patch panel.
2. On the tripack patch panel switch the measure - Cal switch to Cal.
3. Switch the output impedance and the input impedance to 900
4. Have the attenuator set to zero on the patch panel.

1. Position the timing in Variable 1.
2. Position the Mode in A/B.
3. Program 1200 Hz FREQ A.
4. Program 1200 Hz FREQ B.
5. Program .070 Time A.
6. Program .070 Time B.
7. Change the mode to A.
8. Switch cycle switch to cont.
9. Adjust amplitude of tone A to +4 dBm.
10. Switch cycle switch to cont.
11. Change mode to B.
12. Switch cycle switch to cont.
13. Adjust amplitude of tone B to -10 dBm.

The 14 dB difference in levels corresponds to the percentage of 80% modulation.

14. Switch the cycle switch to off.
15. Change the mode to A/B
16. Switch the cycle switch to cont.
17. On the patch panel adjust the attenuation to 38. The A. C. volt meter should read -38 dBm.
18. Switch the patch panel to measure and change the input impedance to 600 .
19. Continue with level-setting procedure.

NOTE: Remove the mouthpiece from the test panel handset.





## TRUNKED REPEATER AUDIO TUNE-UP PROCEDURE

**STEP 1.** Set the **REPEATER LEVEL** control on the Squelch Gate Module fully counterclockwise.

**STEP 2.** Set the repeater **SQUELCH KEY** control on the Squelch Gate Module fully clockwise.

Note: The station must be in the Trunked Mode at this time.

**STEP 3.** Connect an audio oscillator to J5-24 on the rear of the unified chassis and inject a 1 hz. tone at a 1 volt level. Adjust the IDC control, R410, on the Exciter board for 4.1 khz. maximum transmit deviation (+ or -) with the station keyed using the switch located on the front panel of the Station Control Module.

**STEP 4.** Allow the station to revert to failsoft mode by disconnecting the wire going to TB3-13 and verify the status on the front of the Trunk Control Module approximately 1.5 minutes later.

Note: The station must be in the Fail Soft Mode at this time.

**STEP 5.** Adjust the **DATA IDC** control on the Trunk Control Module for a total maximum transmit deviation (+ or -) of 5 khz., or to a level as close as is possible (may be the max pot setting).

**STEP 6.** Reduce the audio oscillator output level to the point where the total transmit deviation is 3.0 khz. The audio oscillator level at which this occurs, measured at J5-24, should be 1/2 the exciter audio set level listed on the front of the exciter cover.

**STEP 7.** Connect an RF generator set at 1000 uv output, modulated with a 1 khz. tone at 3 khz. deviation, to the receiver antenna input.

**STEP 8.** Connect an a-c voltmeter to J2-14 on the rear of the unified control chassis and adjust the **LINE LEVEL** control, R203, on the Audio and Squelch Board for 150 mv a-c.

**STEP 9.** Disable the PL switch on the front of the Station Control Module.

**STEP 10.** Connect an a-c voltmeter with balanced inputs to the Line 2+ and Line 2- terminals of the station and adjust the **LINE 2** output control on the Line Driver Module for a reading of -10 dbm (600 ohm ref. + = .0774 v. rms)

**STEP 11.** Connect an a-c voltmeter with balanced inputs to the Line 1+ and Line 1- terminals of the stations and adjust the **LINE 1** output control on the Line Driver Module for a reading of -10 dbm.

**STEP 12.** Connect an a-c voltmeter to J5-24 on the rear of the unified control chassis and adjust the **EXCITER LEVEL** control on the Station Control Module for the exciter audio set level listed on the front of the exciter cover.

**STEP 13.** Repeat steps 1-12 for each repeater in the system.





## CENTRAL INTERCONNECT TRIB BOARD TUNE-UP PROCEDURE

NOTE: If the TRIB board is connected to a microwave interface containing an input hybrid it may be necessary to insert a 6 db 600 ohm resistive pad on the two wire phone line out of the CIT. This will allow the TRIB to obtain a better hybrid balance. The microwave levels must then be re-adjusted to compensate for the new levels to and from the CIT.

NOTE: Power must be removed from the card cage whenever inserting or removing the TRIB boards.

NOTE: The base stations should also be tuned-up at this time.

### TRIB CIRCUITS ( Phone Line Audio Input Pins)

Circuit #1 = pin # 54

Circuit #2 = pin # 53

Circuit #3 = pin # 52

\*\*\*STEP 1. When each TRIB circuit is tuned up the corresponding control cable that leads to the repeater must be disconnected, the bases of transistors Q5 and Q6 for each circuit must be grounded, and the circuit must be disabled by the front panel switch. (note: 3 circuits per TRIB board) The TELCO interface boards should be jumpered for a 600 ohm phone line impedance at this time.

\*\*\*STEP 2. Adjust the audio oscillator for a level of -10 dbm into the receiver jack on the front panel. With this level being applied to circuit #1 adjust the RECEIVER LEVEL control R5 for a level of -6 dbm at the RX TP2 using a high input impedance a-c voltmeter. (generators source impedance must be 600 ohms).

### RECOMMENDED PROCEDURE FOR STEPS 3-6

\*\*\*STEP 3. Remove the audio from the receive jack and connect it from the TRIB circuit output to ground. With a 1 khz. tone adjust the oscillators output level until a reading of -30 dbm is measured at the TX TP1 with a high input impedance a-c voltmeter. (the generators source impedance must be 600 ohms)

\*\*\*STEP 4. Set the OUTPUT LEVEL control R4 fully clockwise. Connect a 600 ohm terminating a-c voltmeter to the transmit jack on the TRIB boards front panel for circuit #1. Insert JU101 and adjust the IDLE GAIN control for a reading of -20 dbm at the transmit jack.

REMOVE JU101

\*\*\*STEP 5. Set the audio oscillator to 1200 hz. and AM modulate it with a 7 hz. sinewave at 80% with an output level of -10 dbm as measured at the TX TP1 with a high input impedance a-c voltmeter. With this input signal adjust the OUTPUT LEVEL control for a reading of -10 dbm at the transmit jack on the front panel using the 600 ohm terminating a-c voltmeter.

\*\*\*STEP 6. Reduce the input level to the TRIB board to -65 dbm (measured at the TX TP1). Connect an oscilloscope to pin 7 of U7B and set the INCREASER GAIN control to the point where increaser pulses just appear.





Note: The SIDETONE SUPPRESSION control R100 should be left at its factory setting.

\*\*\*\* GO TO STEP 7 \*\*\*\*

#### ALTERNATE PROCEDURE FOR STEPS 3-6

Note: This alternate procedure does not require the use of the AM modulated function generator which may not be readily available.

\*\*\*STEP 3. Remove the audio from the receive jack and connect it from the TRIB circuit output to ground. With a 1 khz. tone adjust the oscillators output level until a reading of -20 dbm is measured at the TX TP1 with a high input impedance a-c voltmeter. (the generators source impedance must be 600 ohms)

\*\*\*STEP 4. Connect a 600 ohm terminating a-c voltmeter to the transmit jack on the TRIB boards front panel for circuit #1. Insert JU101 and set the OUTPUT LEVEL control R4 fully clockwise. Adjust the IDLE GAIN control R3 for a level of -9 dbm at the transmit jack.

\*\*\*STEP 5. Adjust the OUTPUT LEVEL control R4 for a level of -10 dbm at the transmit jack.

Remove JU101

Note: The INCREASER GAIN control R2 and the SIDETONE SUPPRESSION control R100 should be left at their factory settings.

NOTE: Step 6 does not exist, go to step 7.

\*\*\*STEP 7. Remove all cables and grounding leads. Reconnect the station control cable.

\*\*\*STEP 8. Enable this TRIB circuit using the front panel switch and connect the control cable to the associated repeater. Place a call through this TRIB circuit to a quiet terminated line. Connect a high input impedance a-c voltmeter to RX TP2 and inject a 1200hz. tone into the receiver jack at a level of -6 dbm as measured at RX TP2. Adjust the BALANCE control for a minimum on an a-c voltmeter at TX TP1. If a null can not be achieved it may be necessary to change the line impedance jumpering on the TELCO board or the values of the balance network R75 and C1 to match the phone line impedance.

NOTE: A minimum of 30 db isolation between RX TP2 and TX TP1 is required.

\*\*\*STEP 9. While maintaining the same input level to the receiver jack adjust the audio oscillators frequency to a 1000hz. tone and touch-up the RECEIVE LEVEL control R5 for a level of -6 dbm at the RX TP2 using a high impedance a-c voltmeter.

\*\*\*STEP 10. Repeat the entire procedure for each TRIB circuit on every TRIB board in the system.





# PSD BULLETIN

PSD # 562

APC 474, 482, 486

DEADLINE N/A

Date: January, 1986

Memo To: Area Service Managers

cc: Area Field Technical Representatives  
Motorola Hi-Tech Center  
NSO School

From: Jim Bellizio

Subject: NO LOAD VOLTAGE STABILITY OF MSF5000/MSR2000 POWER SUPPLIES.

## KIT NUMBERS EFFECTED

MSR2000 = TPN1192A, TPN1226A, TPN1227A

MSF5000, PURC = TPN1185A, TPN1218A, TPN1226ASP01,  
TPN1227ASP01

It has been noted that on battery charging versions of the MSF5000 / MSR2000 power supplies, that if the A.C. input power is cycled on/off rapidly with NO LOAD on the output of the supply, the A+ output voltage will ratchet up above +20 volts D.C. and the supply goes into an over-voltage default mode.

This condition must be considered during servicing of the supply when it has been removed from the station. The Product Group does not recommend using these power supplies under any conditions without the equivalent of at least a 30 OHM load attached to the A+ output. A suitable load would be Motorola part number 1783389G02 30 OHM, 5%, 20W resistor available through National Parts. Any MSF5000 or MSR2000 station that is properly installed will provide enough load to the supply to prevent this condition. It should be noted that these supplies do not require connection of a battery or load to the station junction box connector for normal A.C. operation.

This bulletin is for informational purposes only. No warranty is implied.





# PRODUCT SERVICES BULLETIN

A.P.C. # 631

SYNTOR-X SMARTNET TRUNKED MOBILE RADIOS P.S.B. # TX85018

The Syntor-X Smartnet radio has been designed with the future in mind. Many system features can be added by a simple code plug change, while others require the inclusion of a second Systems 90 card. This flexibility results in a system that can be easily tailored to the changing needs of the user. Because the selector switches on the control head allow for more positions than may be actually programmed into the radio, an illegal function tone will be heard whenever the operator turns the knob beyond the last programmed position. The tone will stop when the selector switch is turned back to a programmed position.

The Smartnet radio is designed to "remember" all of the selected information each time the unit is turned off by storing it in an EEPROM. A problem can occur if the unit is turned off while in an unprogrammed position (when the tone is present) because the radio will store this information which will be invalid when the unit is turned on. This could result in an inoperable radio.

To avoid this problem, DO NOT TURN OFF THE RADIO WHILE AN ILLEGAL FUNCTION TONE IS PRESENT. Turn the selector switch or Systems 90 button to a programmed position (the tone will stop) and then turn off the power.

If further protection against this potential problem is desired, the user can place stop pins in the System/Subfleet selector switch and/or stop buttons in the Systems 90 card. These items were originally furnished with each radio in Kit HLN4782A. This will prohibit an operator from turning the selector switch too far or pushing unprogrammed buttons.

If W709 was not ordered, then stop pins should be placed in the System Select switch such that only valid systems can be selected (see attached guidelines).

If the upper Systems 90 card is present and W709 was not ordered, then the CONV switch should be stopped.

If W709 was ordered, then stop pins should be placed in the System Select switch such that the largest number of trunked systems or conventional channels can still be accessed.

If an improper write condition has occurred (the radio is inoperable upon turn on), the code plug can be easily modified in the field to correct this condition. A Data I/O Prom Programmer can be used to modify the pertinent addresses as shown below:

<u>Address</u>	<u>Data</u>	<u>Data</u>
	<u>With (W709 or W305 or W829)</u>	<u>All Other</u>
2F	00	00
30	0F	00
31-36	00	00
37	0F	00

If you are unable to resolve conditions as described above, contact your local Motorola ASE or Mobile Product Services at (817) 232-6242 or Ditel 729-6242.

This Product Service Bulletin has been issued as a service aid only and no warranty time is being authorized.





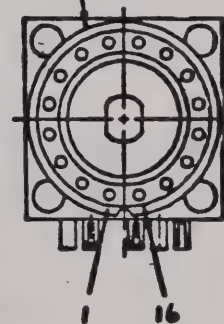
MODEL WITH WB29, W305, OR W709\* (1-16 KNOB)

NUMBER OF SYSTEMS TRNK+CONV	STOP PIN LOCATION(S)	STOP PINS REQUIRED
1	1-16	2
2	2-16	2
3	3-16	2
4	4-16	2
5	5-16	2
6	6-16	2
7	7-16	2
8	8-16	2
9	9-16	2
10	10-16	2
11	11-16	2
12	12-16	2
13	13-16	2
14	14-16	2
15	15-16	2
16	--	0

NOTE\*

FOR W709, THE NUMBER OF SYSTEMS SHOULD BE EQUAL TO THE NUMBER OF TRUNKED SYSTEMS OR CONVENTIONAL CHANNELS WHICH EVER IS GREATER.

REFER TO DETAIL  
FOR ADJUSTABLE STOP  
DRUM DETAIL



REAR VIEW

S1402





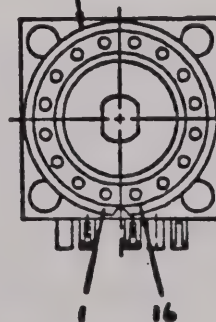
STANDARD MODEL W/D W829, W305, OR W709 (10+6 KNOB)

NUMBER OF CONVENTIONAL SYSTEMS	FIRST STOP PIN LOCATION
0	16
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

NUMBER OF TRUNKED SYSTEMS	SECOND STOP PIN LOCATION
1	15
2	14
3	13
4	12
5	11
6	10

NOTE  
FOR 6 TRUNKED AND 10 CONVENTIONAL  
SYSTEMS NO STOP PINS ARE REQUIRED

REFER TO DETAIL  
FOR ADJUSTABLE STOP  
DRUM DETAIL



REAR VIEW

S1402



# Product Services Bulletin

PSD # 556  
APC # 277, 377  
DEADLINE DATE 12/31/86

November, 1985

MEMO TO: Area Service Managers

CC: Area Field Technical Representatives  
Motorola Hi-Tech Center  
NSO School

FROM: Don Lobdell

SUBJECT: M6809 CENTRAL SITE CONTROLLERS

MODEL AFFECTED: T5004A, T5076, T4051A, T4052A,  
T5076ASP800, T5076ASP801, T5076ASP100, T5076ASP200

KITS AFFECTED: TLN2788A, TLN2789A, TLN2788ASP10  
TLN2788ASP09, TLN2788ASP08, TLN2595ASP01

If you purchased or are servicing a system with a Trunking Passport Interconnect Control Unit (option D163, or models T4051 and T4052) or a T5004A or T5076A Trunking Central purchased in the last year (from December 1984 to November 1985) then the following affects you:

A possible control channel data problem exists with the M6809 Site Controller Boards (RSC09, TSC09, MCB, TCI, DCB, AND ReSC). The problem occurs when the site controller is trying to address a peripheral board (TSC09 to TIBs, RSC09 to RIBs, MCB to the Matrix board, DCB to ACB, TCI to ACB, and ReSC09 to RIBs and RTIBs). The problem may show up more frequently when two or more peripheral boards are used.

The problem was first seen with the TSC09 board and two or more TIB boards. The Control Channel Data (OSWs) was so badly corrupted that the mobiles could not lock on to the Control Channel. This was caused by the address buffers becoming tristated along with a false PIA write.

The solution shown in this memo will prevent the address bus from going tri-state (the runner cuts and jumpers) and the PAL change will do a more complete address decode.

The change to the TSC09 board (TLN2789A) and the RSC09 board (TLN2788A) will require two of the PC board runners cut, two jumpers added and the U24 PAL changed. For the TSC09 board, the U24 PAL (TRN5726A) should be removed and a 5184061P08 (TRN5726B) PAL installed. For the RSC09 board,





the U24 PAL (TRN9306A) should be removed and a 5184061P09 (TRN9306B) PAL installed. See figure 1 for the runner cuts and jumper instructions. See chart for PAL changes and part numbers.

If you are getting error messages from the Passport Unit (TLN2595A) such as the following:

	<u>DIAG</u>	<u>ICU</u>	<u>NN</u>	<u>\$\$</u>	<u>NN=\$00 - \$1D</u>
INVALID COMMAND FROM PLIB		ICU	NN	E0	
OFF-HOOD ON UNASSIGNED PLIB		ICU	NN	E1	
OFF-HOOK NOT AT RING STATE		ICU	NN	E2	
ON-HOOK ON UNASSIGNED PLIB		ICU	NN	E3	
INTERDIGIT T.O. ON UNASSIGNED PLIB		ICU	NN	E4	
TONE DONE ON AN UNASSIGNED PLIB		ICU	NN	E5	
DIGITS FROM AN UNASSIGNED PLIB		ICU	NN	E6	

Then you may want to make the runner cuts and add the two jumpers as shown in figure 1 to the MCB. Do NOT change the PAL on the MCB board.

If you have a Simulcast System then, it is recommended that the runner cuts be made and the two jumpers be added as shown in figure 1 for the DCB (TLN2788ASP09). You will also have to change the U24 PAL at the same time you make the cuts, and add the jumpers. Remove the U24 PAL on the DCB (TRN5726A) and install a 5184061P08 (TRN5726B) PAL. The ReSC09 board (TLN2788ASP08) should also have the runner cuts, add the two jumpers and a U24 PAL changed. Remove the U24 PAL (TRN9306A) and install a 5184061P09 (TRN9306B) PAL for the ReSC09.

If you have a TCI Console Interface board (TLN2788ASP10 or TLN2595ASP01) then you should make the runner cuts and add the two jumpers as shown in figure 1 for the TCI. You will also have to change U24 PAL at the same time you make the cuts and add the jumpers. Remove the U24 PAL (TRN5726A) from the TCI and install a 5184061P08 (TRN5726B) PAL.

We recommend doing this rework on all of these systems even though you may only have one TIB board, to prevent these problems should you expand your system at a later date.

Labor not to exceed 1/2 hour per each board by an authorized Motorola Service Center can be charged to warranty using the standard labor labor warranty claim form, #R0-21-19B. Reference must be made to this bulletin number on the SP authorization number line and include the model number and serial number for each system.

New PALs, ordered by part number can be obtained at no charge from the National Parts Department when referencing this PSD bulletin number until Dec. 1986.





# CHART FOR PAL CHANGES

## REMOVE

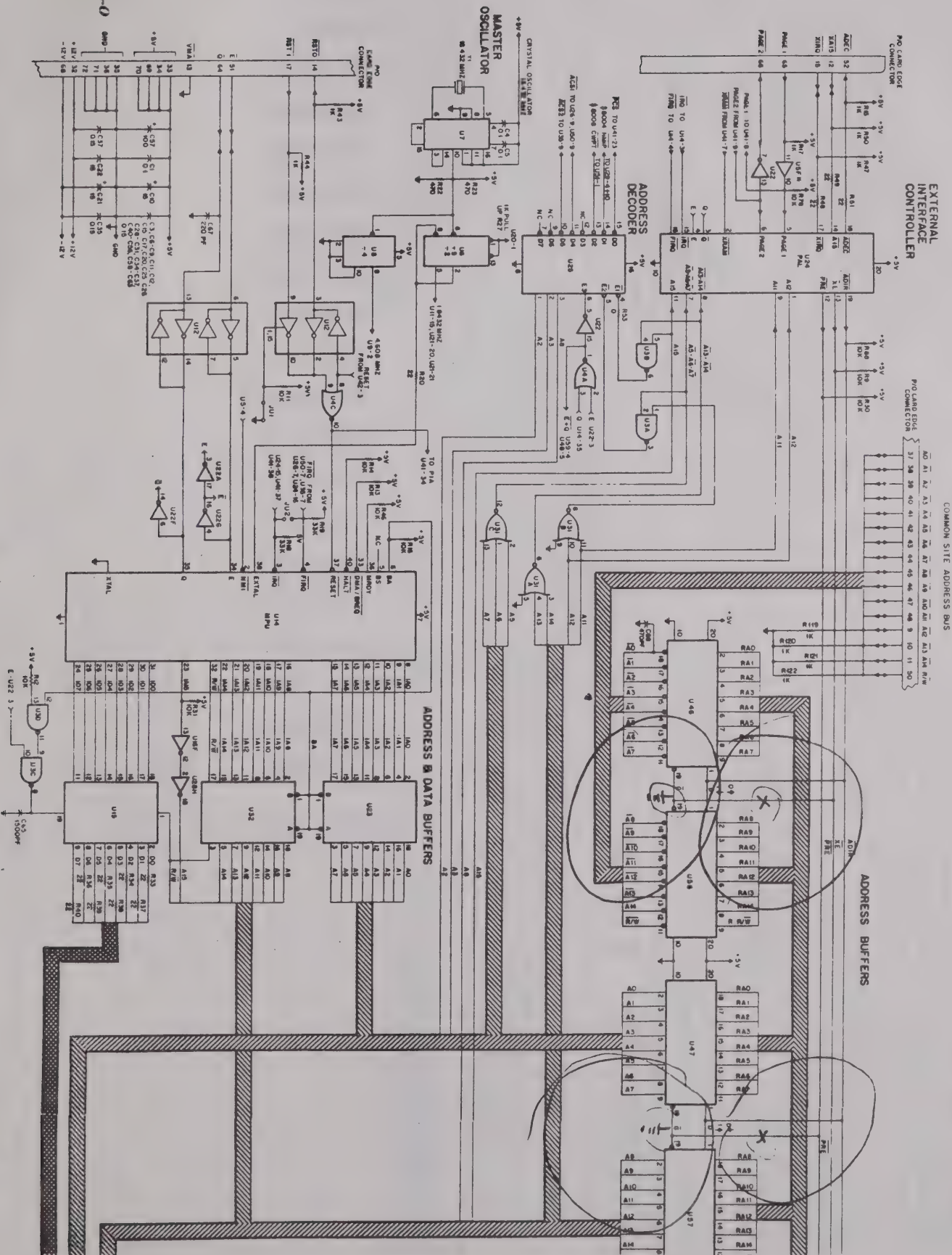
## INSTALL

BOARD	KIT		PAL KIT	PT #		PAL NEW KIT	NEW PT #
RSC09	TLN2788A	U24	TRN9306A	51-84061P05		TRN9306B	51-84061P09
TSC09	TLN2789A	U24	TRN5726A	51-84061P01		TRN5726B	51-84061P08
TCI	TLN2788ASP10	U24	TRN5726A	51-84061P01		TRN5726B	51-84061P08
TCI	TLN2595ASP01	U24	TRN5726A	51-84061P01		TRN5726B	51-84061P08
DCB	TLN2788ASP09	U24	TRN5726A	51-84061P01		TRN5726B	51-84061P08
RESC09	TLN2788ASP08	U24	TRN9306A	51-84061P05		TRN9306B	51-84061P09
MCB	DO NOT CHANGE	PAL	-----	-----		-----	-----



# SITE CONTROLLER BOARD

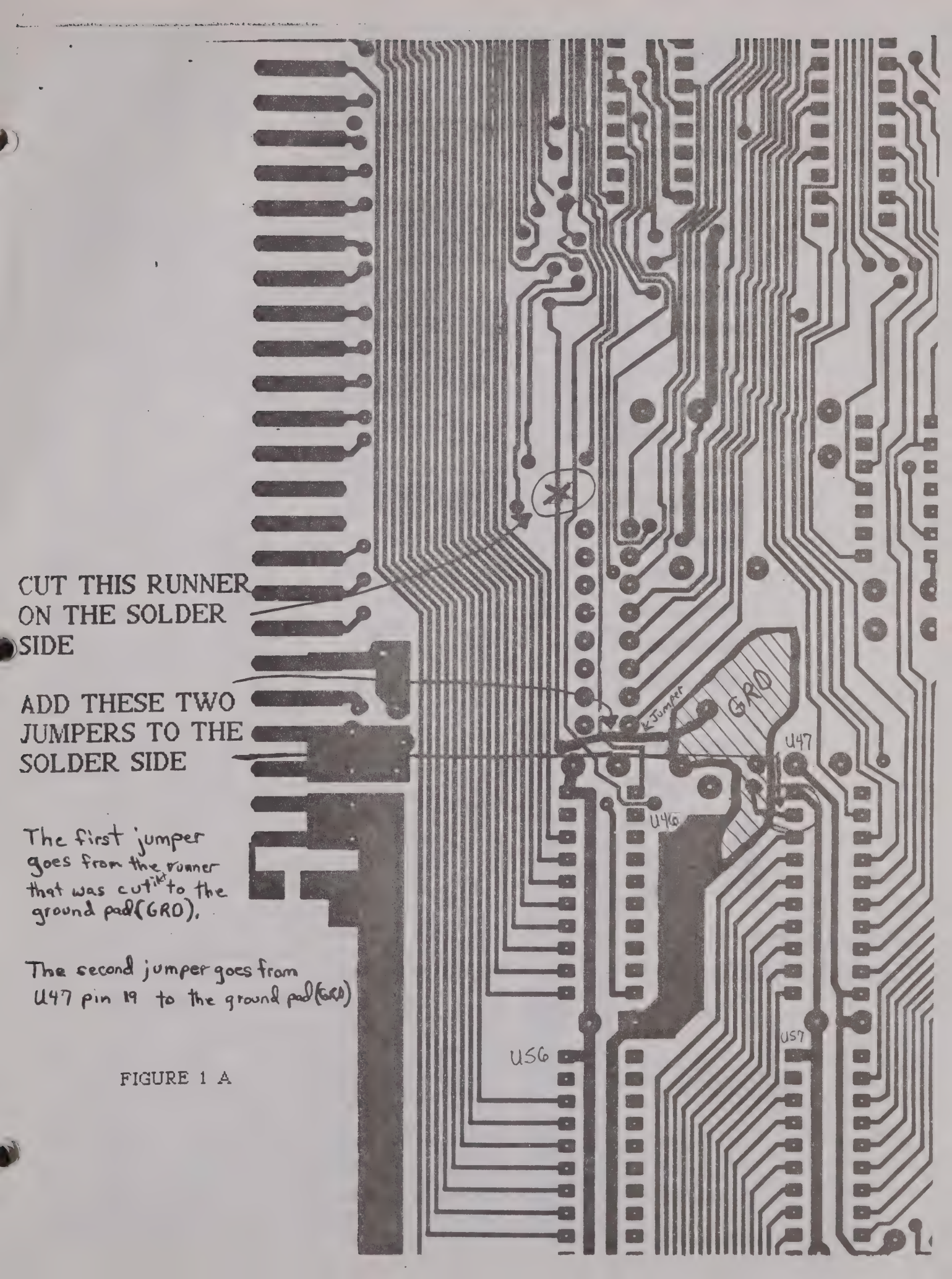
## MODELS TRN2595A, TLN2788A, TLN2789A



Motorola No. PEPS-38816-0  
(Sheet 2 of 3)  
2/78/04 P111







CUT THIS RUNNER  
ON THE SOLDER  
SIDE

ADD THESE TWO  
JUMPERS TO THE  
SOLDER SIDE

The first jumper  
goes from the runner  
that was cut to the  
ground pad (GRD).

The second jumper goes from  
U47 pin 19 to the ground pad (GRD)

FIGURE 1 A

U56

U46

U47

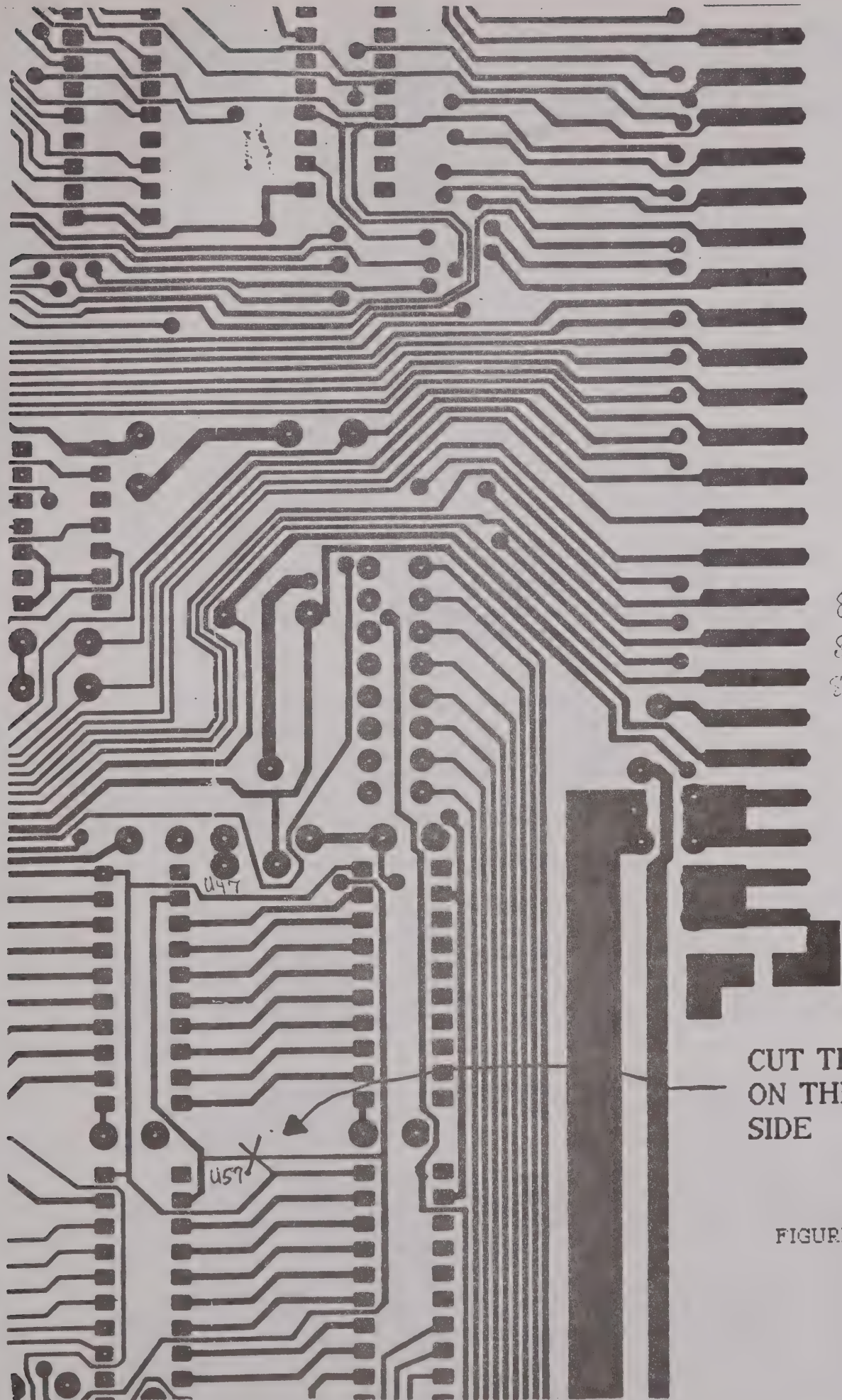
U57

GRD

K-Jumper







84E84405N01  
84E84405N02  
84E84405N03  
Boards

CUT THIS RUNNER  
ON THE COMPONENT  
SIDE

FIGURE 1 B



# Product Services Bulletin

PSD #557  
APC 228  
DEADLINE 6/30/85

Date: December 4, 1985

To: Area Service Managers

Area FTR Managers

cc: Motorola Hi-Tech Center  
NSO School  
C & E Parts Department

From: Vern McKinnon

Subject: **CENTRACOM II - BMN 6007A GOOSENECK MICROPHONE  
(K703AA OPTION)  
MECHANICAL SERVICE AIDS - INSTALLATION AND REMOVAL  
+ PART NUMBERS**

Recent field reports advise that the microphone's threaded mounting bushing may slip when the gooseneck is being installed and thus preclude proper tightening. Also, since the bushing and gooseneck can slip together, microphone removal for servicing it or items related to the radio control panel may become somewhat difficult. If the slippage is evident refer to the diagram at the end of this bulletin and utilize the following recommendations.

1. If you are installing this unit for the first time, check to see if the washer under the 3/8 x 32 nut in back of the bushing is a flat washer or lock washer. If it is a lock washer merely check to make sure that the nut is tightened **very securely**. Then proceed to install as usual (per the manual). If the washer is a flat washer, proceed to step number 3.
2. If the microphone is already mounted and exhibits the slipping problem, carefully remove it from the enclosure and also proceed to step 3.
3. Unsolder the cable phono connector so that the 3/8 x 32 nut and flat washer can be taken apart. (ie. remove the 3/8 x 32 nut and flat washer) It might take additional force because the assembly was factory assembled with "Locktite".
4. Add several drops of "Locktite" P/N 11-10019B59 (or equivalent) between the brass bushing and casting interface. This will help to eliminate any possibility of future slippage.



5. Replace the flat washer (0400007641) with an internal star lock washer (Part # 0400007698). Reinstall nut and tighten securely.
6. Re-solder the phono connector making sure that the connections are not shorted.
7. Re-install completed assembly on enclosure rail and screw gooseneck mic hand tight.

NOTE:

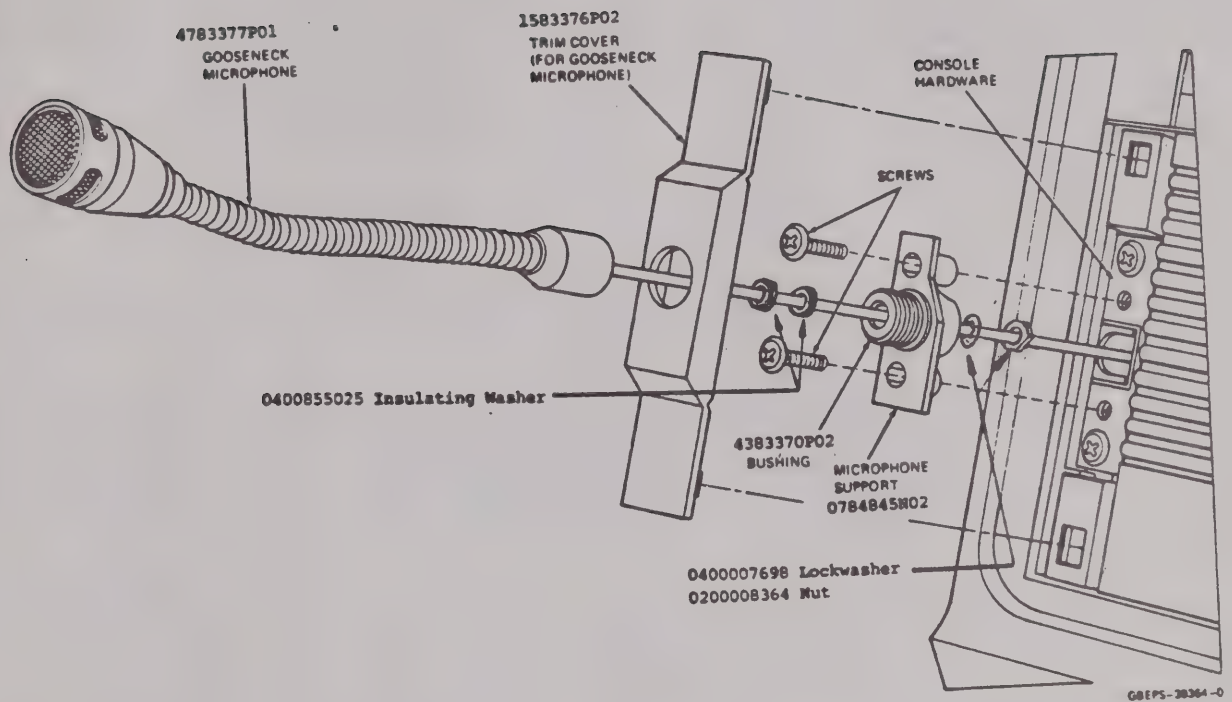
Some gooseneck mic's were shipped without insulating spacer washers located between the brass bushing and gooseneck assembly. The washers (spacers) were added to allow the flexible tubing assembly to seat on the brass bushing and not the plastic cover (P/N 1583376P02). If your mic assembly doesn't have these spacers, add two (Part # 0400855025) so that the flex tubing will not seat on the plastic cover (see enclosed drawing).

This bulletin is a service aid and does not imply any additional labor warranty authorizations. However, the above referenced parts (lock washer and insulating spacers) can be obtained from C&E Parts Department in package quantities of 100, but they can also be procured locally. The insulating spacers can be metal or fiber of 1/2" or 9/16" diameter. However the washer stack height spacers or thickness should be 1/4". The star washer can be external or internal. **DO NOT use a split washer.**

BMN6007A microphones shipping from the factory after 11/2/85 will contain the lock washer and insulating spacers.

The attached drawing also furnishes frequently requested mechanical part numbers of the microphone assembly that are not currently shown in the instruction manual.

Attachment (Drawing)



*Figure 8. Gooseneck Microphone Assembly*







**MOTOROLA INC.**

PSD F-314  
APC 527  
DEADLINE DATE: May 31, 1986

MEMO TO: PSD Mailing List

DATE: November 22, 1985

FROM: Greg Sadler

SUBJECT: Control Head Microphones (P1214, 15 And P1218, 19)

The following information is being published as a service aid to field personnel.

A possible problem has been noted, which occurs randomly and only on de-keying of the microphone. The problem is that the unit locks up and the only way to restore proper operation is to turn the radio off then back on again. So far, the problem is limited to the scan versions only (Models P1215 and P1219).

The symptoms are as follows:

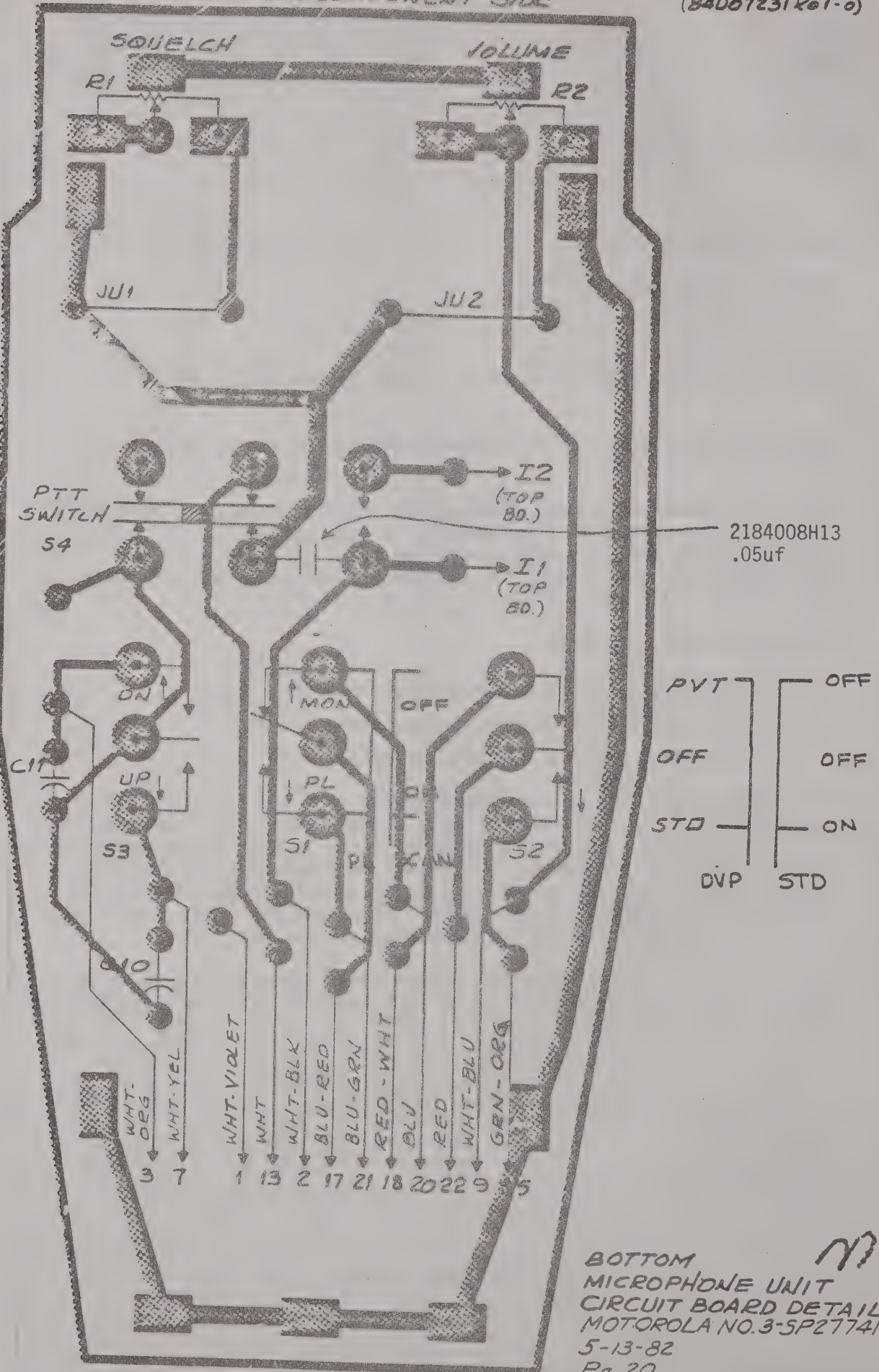
1. The display will dim and possibly display a zero.
2. The unit will no longer change channels.
3. The radio may not transmit correctly.

The problem stems from noise/contact bounce on the PTT line. This causes some of the I.C.'s to latch up. The placement of a .05 uf cap from the PTT line to ground resolves the problem. This is best accomplished by putting it in the microphone. A suitable part number is 2184008H13; it is the same cap as found on page 41 of the manual. Future builds of this product will have this additional cap on the PTT line. Please refer to the attached document for part placement in the mic.

Parts and one-half hour labor for installation are available under warranty. To obtain this modification, contact your local Service Representative or Motorola Service Station.

Greg Sadler  
Product Services,  
Plantation

GS/bjg



# Product Services Bulletin

PSD #558  
APC 228  
DEADLINE 9/30/86

Date: December 13, 1985

To: Area Service Managers  
Area FTR Managers

cc: C&E Parts Department  
Hi-Tech Facility  
NSO School

From: Vern McKinnon

Subject: **CENTRACOM II - B1422A BIM - FIRMWARE PROM CHANGE**

1. BIM Lock-up With LOTL Options K59AK,L
2. High Level Paging, Test and Alert Tones
3. DLM Receive Audio Level Variations
4. Centracom Series II Transmit Levels

A new Base Interface module (BIM) firmware prom (part #5190044C02) has been developed that will resolve the following types of field reported problems:

1. A B1422A BIM with a Line Operated Busy Light (LOTL) Option (K59AK,AL) will lock up if the operator attempts a Bar Transmit while a parallel unit has the station keyed. This problem can occur when the prom in the BIM (U4) has P/N 5190006C78 or 5190006C90. Neither of these part numbers, located on the white tape on top of the prom, were utilized in factory units that shipped after March 1985. Many customers have already had these prompts updated to later version prompts via direct exchange with the Product Service Department.

2. Paging tones, Test Tones and Alert Tones are set -6 DB too high compared to average voice. This makes the voice sound weak compared to the tone. This problem can occur if the prom in the BIM (U4) has P/N 5190006C78, 5190006C90, 5190006C90 LOTL 3, or 5190006C90 LOTL 4 on the white tape on top of the prom. Factory units that shipped after June 1985 utilized other updated versions of the prom that would not allow this symptom to occur. Likewise, many customers have already had these prompts updated via direct exchange transactions with the Product Service Department. See attached memo for transmit level setting considerations.

3. The Receive Audio Level occasionally varies in the middle of the conversation. Some field reports refer to this



as "fading" or "blooming" received audio. The symptom may be more noticeable in smaller communications systems. This symptom can occur when the BIM prom (U4) is any other part number utilized prior to the current version part number 5190044C02. These other part numbers, as seen on the white tape on top of the prom are 5190006C78, 5190006C90 LOTL3, LOTL4, LOTL5, 5190006H44 and 5190006H44VA. Some customers have already had these proms updated to the latest version via a direct transaction with the Product Service Department or Area Field Technical representatives. Customer equipment leaving the factory after 12-20-85 will only contain the latest version prom part number 5190044C02.

4. Transmit levels (see attached Tutorial on Series II Transmit levels).

It is requested that all customers' units be updated to contain the latest prom part number 5190044C02. This device is being made available on a no charge/equal and offsetting credit basis through C&E Parts. To obtain the replacements the standard STIC 5-K Parts Warranty Replacement Form must be used. The form **must** reference this field bulletin number, the B1422A BIM number and the Console's System Timer serial number which can be found on the white tape on the handle of the BLN6650A module located in the Central Electronics Bank (CEB) Card Cage. To facilitate the handling of the replacement request, the new prom P/N, (51-90044C02), the BIM model number (B1422) and the S/N from the system timer label must be listed separately for each prom being requested (see attached sample STIC 5).

A small quantity of customers' systems contain an SP or non-standard prom in the U4 location of the BIM. These proms will usually have an additional insignia on the white tape such as HLGT, RPTR, etc. Replacement BIM proms for these systems require special handling. Therefore, the STIC 5-K's for these type systems must be mailed to:

Motorola Product Service Department  
1301 E. Algonquin Road  
Schaumburg, Il. 60196  
Room 2511 - Attention CCII Product Service Engineer

A short note must be included describing the original SP to the BIM.

Replacing the BIM prom is a straight forward removal of the old prom and insertion of the new prom. The green LED on the BIM will be on if the prom was installed properly. Also depress the INSTANT XMIT switch on the associated CCM and

verify that the TRANSMIT LED comes on to assure that the BIM is still functioning.

Field Labor Charges, including travel time to replace these devices will be accepted on the standard R0-21-19B Labor Warranty Form if the form is submitted with the customer name, system timer serial number, the part number and the quantity of BIM prompts replaced, and reference made to this field bulletin. The following table will designate the **allowable hourly labor charge** vs quantity of BIM prompts replaced.

Quantity of BIM Proms Replaced	Total Warranty Labor Hrs. Allowed
1 - 3	1.0 Hours
4 - 6	1.5 Hours
7 - 9	2.0 Hours
10 - 12	2.5 Hours
13 - 18	3.0 Hours
19 - 24	3.5 Hours
25 or More	+ 0.5 Hours For Each Additional 6 Proms or Fraction Thereof

Attachments: STIC-5K - Sample  
Centracom Series II Transmit Levels



**MOTOROLA Inc.**

COMMUNICATIONS DIVISION—PARTS DEPARTMENT  
1313 E. ALGONQUIN RD.  
SCHAUMBURG, ILLINOIS 60196

**REQUEST FOR IN-WARRANTY REPLACEMENT**

SHADED AREA BELOW FOR MOTOROLA USE

DATE		CONTROL NO.	
CUSTOMER NO.		BILL-TO TAG	
SOLD-TO TAG		SHIP-TO TAG	
TOTAL LINES		COMM.	
ACCOUNT NO.		SALESMAN NO.	
CONG. CODE		STANDARD MESSAGE	
CONTRACT NO.		83000	
S.E.L. ORS			

**OVERRIDES**

**NOTE**

REPAIRABLE - BOARDS AND ASSEMBLIES  
ARE NOT REPLACED UNDER WARRANTY.

CALL YOUR AREA PARTS OFFICE FOR IN-  
STRUCTIONS ON IN-WARRANTY REPLACEMENT OF PARTS.

PUT CRYSTALS AND REEDS ON  
SEPARATE FORM AND MAIL TO

CRYSTAL SERVICE DEPT.  
2553 N. EDGINGTON ST.  
FRANKLIN PARK, IL 60131

**PRINT OR TYPE PLEASE  
INFORMATION TO BE  
COMPUTERIZED**

DATE RECEIVED	CARRIER
SPECIAL INSTRUCTIONS:	

ACCTG. REC. CUSTOMER NO.		REQ. PICK DATE		MAN 1 % MAN 2 % MAN 3 %	
S.I.C.					
PICKING VOUCHER					

ITEM NO.	PART NUMBER	EIA DATE CODE	EQUIPMENT		ITEM NO.	PART NUMBER	EIA DATE CODE	EQUIPMENT	
			MODEL NUMBER	SERIAL NUMBER				MODEL NUMBER	SERIAL NUMBER
1.	519044 C02		B1422A	228-222222	11	SYSTEM TIMER			
2.	5190044 C02		"	"	12	S/N RECD			
3.	5190044 C02		"	"	13.				
4.	5190044 C02		"	"	14.				
5.	5190044 C02		"	"	15				
6.					16.				
7.					17.				
8.					18.	REFERENCE		PSD #558	
9.					19.				
10.					20				

MUST BE OWN CLAIM FORM

NOTE: Parts in warranty will be replaced or repaired at no cost—subject to audit. No responsibility is assumed by Motorola for parts returned that are out of warranty. See reverse side of customers copy for warranty and instructions. Parts out of warranty will not be returned.

SUBMITTED BY:	X
QUALITY ASSURANCE	
(SIGNATURE)	



SUBJECT: TUTORIAL ON SERIES II TRANSMIT LEVELS

There are five different types of signals which can be transmitted from the BIM including Tone Remote Control, Voice, Paging Tones, Alert Tones, and Test Tones. A single transmit level POT on the BIM adjusts all of these signals together. The relative level of these five types of signals are fixed according to the description below:

1. TONE REMOTE CONTROL

The relative amplitude of High Guard, Function Tone, and Low Guard are defined according to the Tone Remote Control Standards such that Function Tone is 10 dB below High Guard and Low Guard is 30 dB below High Guard.

2. VOICE

A 1000 Hz tone injected into the mic path above the DLM threshold should be near the level of High Guard. With the dynamics of the DLM circuit, average voice will be 6 to 10 dB below the level of this tone.

3. PAGING TONES

Paging tones are de-emphasized with a pole at 300 Hz to compensate for the pre-emphasis at the base station. As a result paging tones are transmitted flat. The relative amplitude of the paging tones is adjusted to be slightly higher than average voice for 1000 Hz tones. Lower frequency tones may be as much as 9 dB higher than average voice and high frequency tones may be as much as 9 dB lower according to the de-emphasis curve. This assures maximum signalling sensitivity without the risk of distortion and falsing do to IDC clipping.

4. ALERT TONES

The primary purpose intended for alert tones is to provide means for alerting field units under certain conditions. The amplitude of this tone received by the field unit should be loud enough to demand attention but not so loud as to be painful. This is also the level of 1000 Hz paging tones.

NOTE: If a paging exists on a particular channel, the Alert Tone should not be set higher than 0 dBm to avoid clipping of low frequency paging tones in the BIM line driver.

5. TEST TONES

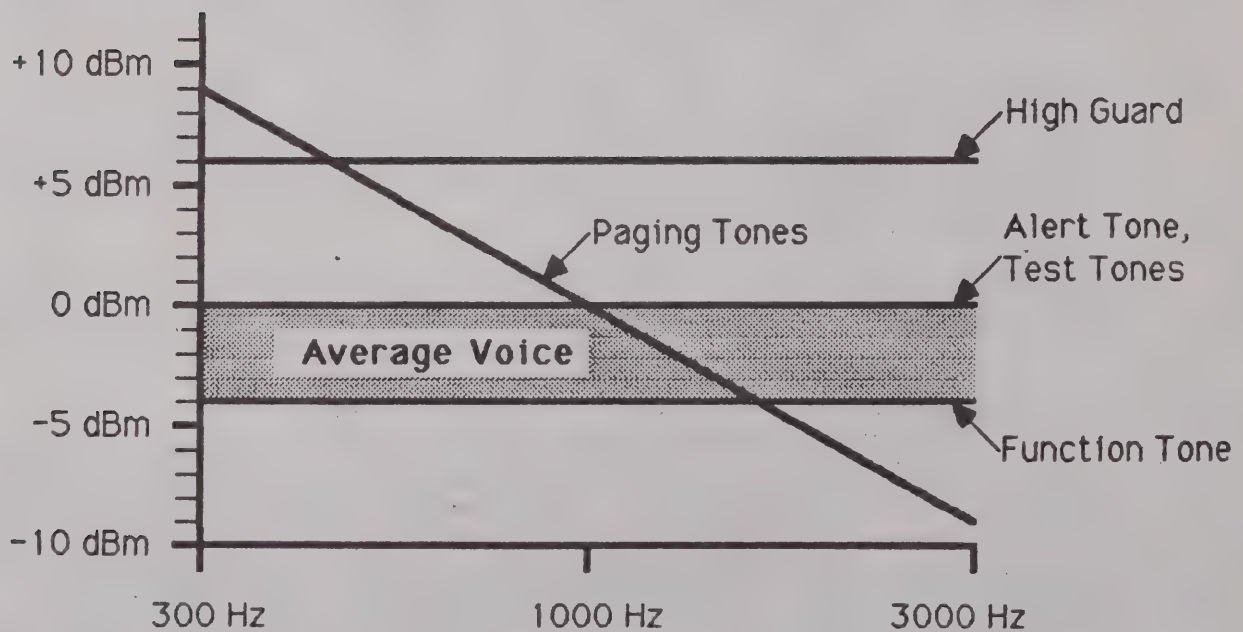
As an aid to setting the transmit level, a BIM will generate a sequence of tones after its reset button is depressed and released. This sequence of tones consists of 5 seconds of 1000 Hz followed by 3 seconds of 300 Hz followed by 3 seconds of 3000 Hz. The amplitude of these tones will be the same as Alert Tones and 1000 Hz Paging Tones. All three test tones are transmitted at the same level and provide a simple means of checking frequency response of the signal path to the base station. Since Guard Tone is not present during the test tone sequence, the transmitter will not key.

The attached chart provides a graphical representation of the relative signal levels for a typical example where the Test Tone is set for 0 dBm. In this case 300 Hz paging tones would be +9 dBm and 3000 Hz paging tones would be -9 dBm. Adjusting the BIM transmit pot will move all these signals up or down together.

NOTE: The maximum BIM output before line driver clipping is +11 dBm.

We recognize that all systems are different and external pads and compensating networks may be required to satisfy the needs of the particular system. We hope this information will be useful to you.

## BIM TONE LEVEL RELATIONSHIPS



# Product Services Bulletin

PSD #552  
APC 482  
DEADLINE DATE: 7-1-86

November, 1985

MEMO TO: Area Service Manager

CC: Area Field Technical Representatives  
NSO School

FROM: Jim Langerman

SUBJECT: UHF MSR 2000 POWER AMPLIFIER (TLE 2283A)

There have been some field failures of R801 with fracturing of the solder joints on the power distribution board (TRN5706) of the UHF MSR2000 power amplifier. Failures have occurred primarily on stations with high transmitter usage. For this reason, the power amplifier has been updated. The change includes the redesign of R801, the re-layout of the PC board, and improvement in the power control circuitry. Stations shipped with TLE2283B after 10-26-85 already have these modifications.

To determine if you are experiencing a problem with R801, here are some helpful tips:

- 1) If you are experiencing intermittent power output, monitor power control meter 5 simultaneously with power output. If meter 5 drifts with power output drift, it is very likely that R801 is the problem.
- 2) If you are experiencing constant low power output, (while the power amplifier heatsink is at room temperature) turn the current limit pot R939 on the power control board fully clockwise. If the power output comes back to full rated power, R801 may be the problem. If the power output is still low, check the DC voltage at the collector of Q805 (while de-keyed). If the voltage is not at least 12VDC, then R801 may be the problem. If the voltage is at least 12 VDC, then R801 is not the problem.

Midwest Service in Schaumburg Ill has been set up as the reconditioning center for these PA's. The reconditioning consists of replacing the power distribution board (TRN5706), and the power control board (TRN5696A). These reconditioned PA's carry a 120- day warranty. If you have an R801 problem, you can get a reconditioned updated power amplifier free of charge by turning in your failed power amplifier. Contact Midwest Service for details and shipping instructions.

Reference this PSD bulletin #552 when working thru Midwest service, who's phone number is 312-576-5760 or Ditel 736-5760.



NOTE:

Serial number must be provided to qualify for the 120 day warranty. The PA will be turned around within 24 hours upon receipt. If there are additional problems in the PA other than what is explained within this bulletin, normal warranty or T and M prevails.

The MSS/COMSS should note this PSD for the charges incurred for handling of the PA. One hour labor maximum plus travel and shipping costs maybe submitted on the labor warranty claim form (R021-19).

Regards,

*Jim*

# Product Services Bulletin

PSD 554  
APC 228  
DEADLINE N/A

Memo to: Area Service Managers  
Area Field Technical Representatives

cc: Motorola Hi-Tech Center  
NSO School

From: Jim Bellizio

Subject: CENTRACOM II - OPERATOR POSITION MAIN MICROPHONE  
SENSITIVITY.

The DLM circuit in the Series II console is designed to accommodate a wide range of input level with no user adjustment. This wide range covers reasonable extremes in dispatch center environment. If the background noise in the dispatch center exceeds this reasonable extreme it could be considered valid audio by the DLM circuit. In this case the DLM could bring up the amplitude of the background noise during pauses in the dispatcher's voice. If the background noise cannot be controlled then it is usually possible to decrease the sensitivity of the DLM so that the background noise can be ignored by the circuit. The risk here is that a soft spoken dispatcher who does not talk directly into the microphone may not reach full deviation. Therefore this modification should be made with caution.

The following steps describe the recommended method of reducing the DLM sensitivity with respect background noise.

NOTE: Other information is available concerning DLM attack and use of the headset microphone. For more information on Sensitivity on the headset microphone refer to PSD #543.

## STEP 1

Choose a new set of values for R104 and R106 from the table below based on the amount of sensitivity reduction desired.

SENSITIVITY REDUCTION	R104	R106
AS SHIPPED	82 OHM	1 M OHM
6 dB less sensitive	150	470K
12 dB less sensitive	330	220K
18 dB less sensitive	680	100K

The new replacement for R104 and R106 should be a 5%, 1/4 watt resistor. Motorola part numbers for the resistors listed are given below.

150	0611009A29	470K	0611009B14
330	0611009A37	220K	0611009B06
680	0611009A45	100K	0611009A97

#### STEP 2

Locate R104 (an 82 ohm chip resistor) and R106 (a 1 Meg ohm chip resistor) on the bottom side of the BLN6612A Master Control Board as shown in Figure 1. Remove these two parts by first removing as much solder as possible from each end. Then give the part a gentle twist with a pair of long nose pliers. The part will give from the board and can be removed.

#### STEP 3

Locate U5 on the top of the BLN6612A board as shown in Figure 2. Solder the new R106 from U5 pin 1 to U5 pin 2 as shown.

#### STEP 4

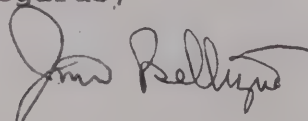
Locate C6 and P9 on the top of the BLN6612A board as shown in Figure 2. P9 is an RCA jack for the main microphone and C6 is a 22uF electrolytic capacitor located directly to the left of Q13. Tack the new R104 from the negative leg of C6 to the mounting tab on P9 as shown. It may be necessary to remove C6, make the solder connection to the resistor, and re-insert the part.

#### STEP 5

The BLN6612A should be replaced in the tray and all cables reconnected. Now the microphone should be tested for correct operation.

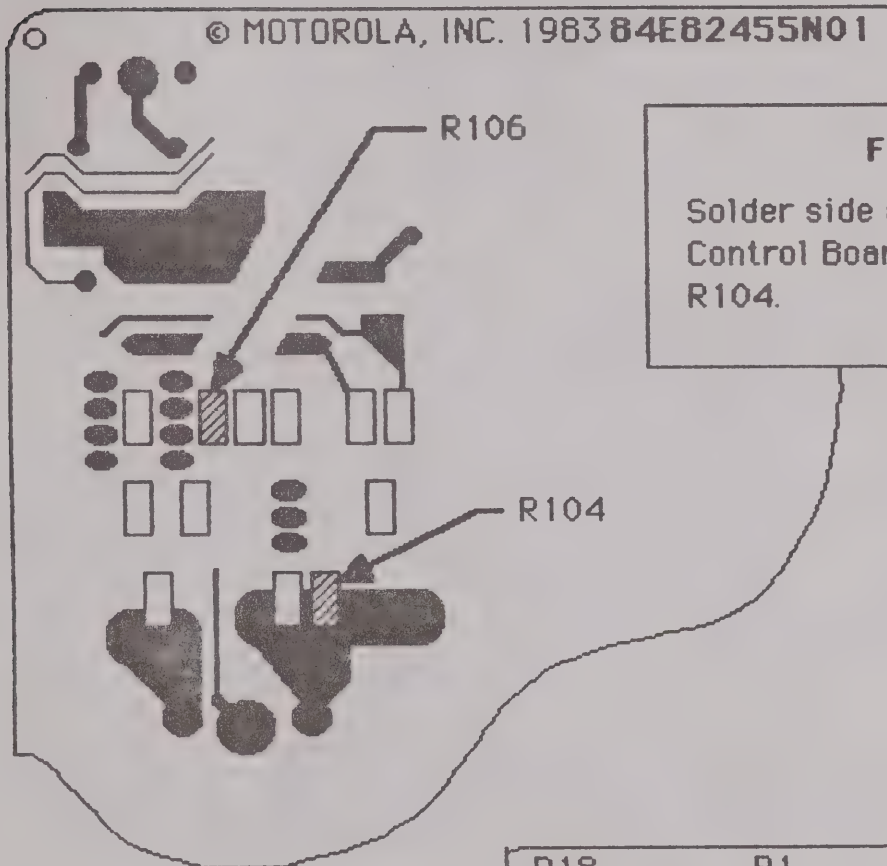
This bulletin is for information only, and no warranty authorization is implied.

Regards,



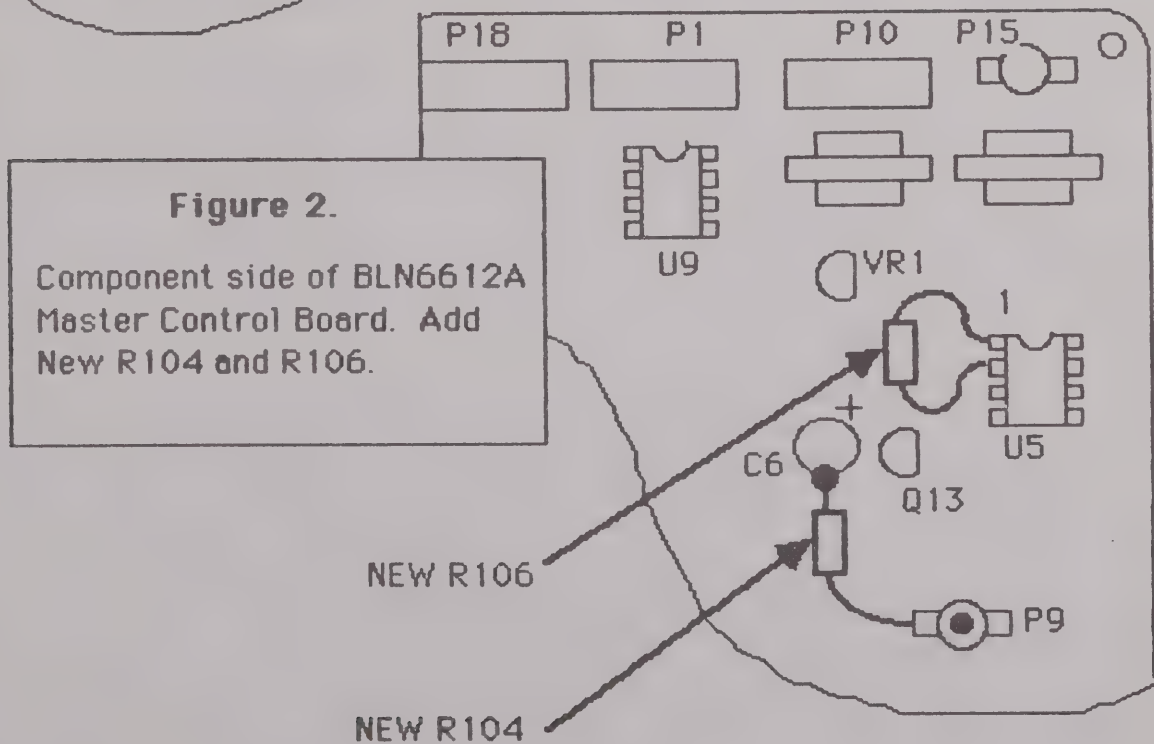


# Centracom Series II Microphone Sensitivity Change



**Figure 1.**

Solder side of BLN6612A Master Control Board. Remove R106 and R104.



**Figure 2.**

Component side of BLN6612A Master Control Board. Add New R104 and R106.



# Product Services Bulletin

PSD #555  
APC 228  
DEADLINE 9/30/86

Date: December, 1985

To: Area Service Managers  
Area FTR Managers

cc: C&E Parts Department  
Hi-Tech Facility  
NSO School

From: Vern McKinnon

Subject: CCII - ACOUSTICAL CROSSMUTE FEEDBACK  
TELEPHONE HEADSET INTERFACE APPLICATIONS  
FIELD MODIFICATION - BLN6612A RADIO CONTROL BD (RCB)

Some field reports have been received with a complaint about feedback between adjacent consoles. The situation is normally resolved by activating the acoustical crossmute function in the personality prompts via the field prompt programmer. However, the symptom may still occur when an operator at one console is talking on the telephone through the console's headset and also has a channel selected that is being keyed by a nearby console.

The problem occurs because the acoustical crossmute is disabled for the select speaker audio at a console whenever it has a headset plugged in. This problem can be solved by not allowing the headset to disable the acoustical crossmute.

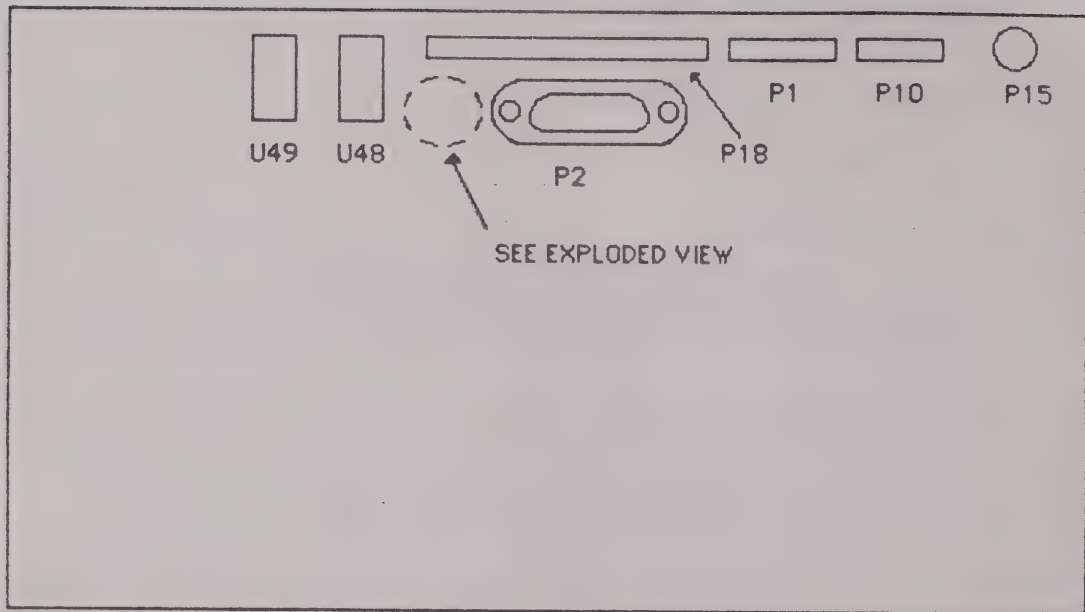
The following procedure will correct the problem. If the procedure is followed exactly, the OMI will not need to be reset. **First** remove the headset from the headset jack. **Then** remove the 7 pair CEB cable from connector P2 on the RCB. The console can now be powered down. Cut the foil that connects P18-21 to U45-13 on the component side of the RCB, BLN6612A between U48 and P2 as shown on the attached diagram. Power up the console after completion of the modification **before** re-connecting the 7 pair CEB cable and headset.

The time required per operator position should be no more than 30 minutes for the first position at a location and 15 minutes for each additional position at the same location. No extra components are required. Field labor charges to implement the modification per the above time limits, plus travel charges will be accepted on the RO-21-19B warranty labor form if submitted with the customer name, and serial numbers of each operator position with reference made to this field bulletin. The serial numbers that must be used can be found on the white label on the handle of the BLN1143A or BLN1149A OMI module associated with the particular operator positions.

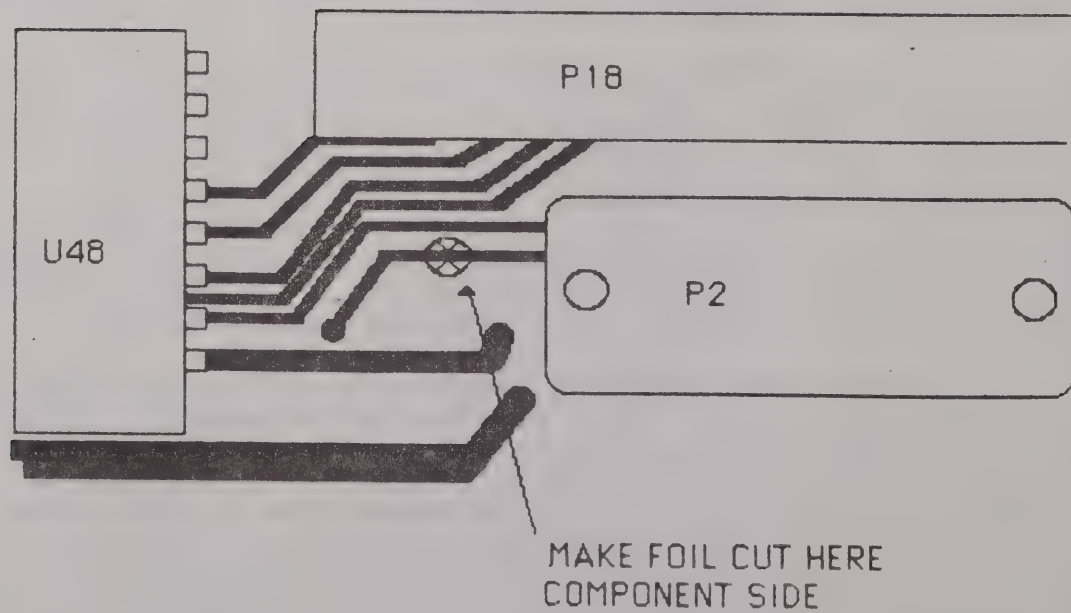
(over)



# RCB BLN6612A



## EXPLODED VIEW



# Product Services Bulletin

PSD # 559

APC 281

DEADLINE 12/31/86

Date: January, 1986

To: Area Service Managers

cc: Area Field Technical Representatives  
Motorola Hi-Tech Center  
NSO School

From: Don Lobdell

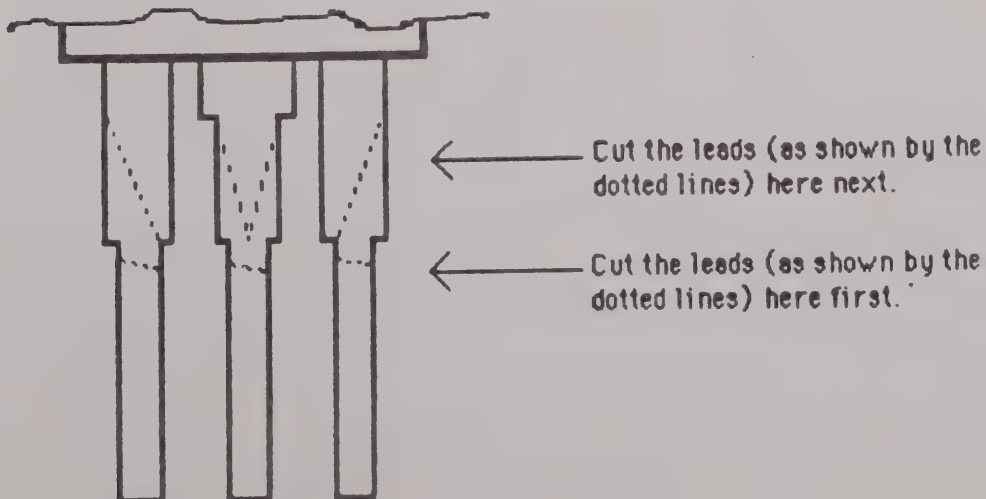
Subject: Voltage Regulator Replacement

Equipment Affected: M1099A, M1100A, M1102A, M1108A  
M1176A, M1177A, M1179A, M1180A

Kits Affected: MLN6287A and MLN6329A Channel Modems,  
MLN6330A and MLN6331A Synchronization Units

Due to the failures of the 51-83629M44 18 volt regulator, we are cancelling PSD 545 and recommending that all regulators with a date code of QQ8401 or later (see Fig 2) be replaced with the T.I. part-under the same Motorola part No.

Due to recent packaging changes on the 51-83629M44-18-V voltage regulator, replacement voltage regulators may not be mechanically compatible with the mounting available on the frame. This is the case when the area on the frame to which the I.C. is mounted contains only a circular hole and not a slot for the screw to pass through. Also, a new insulating shoulder washer is required (Motorola P/N 04-84180C01 replaces 0410057A13). There are simple modifications to be made to the leads of the integrated circuit. The only tool required is a sharp pair of small side cutters. Cut the leads as diagrammed below.



These modifications allow the regulator body to mount closer to the printed circuit board. Before soldering the leads into place, mount the regulator to the frame with the mica insulator, nut, bolt, and new insulating washer. This will insure the correct mounting height.

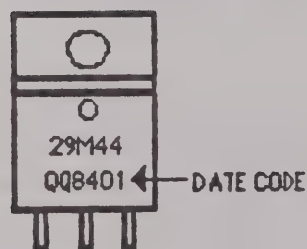
At the same time it is advisable to replace the 15 volt regulator - Part Number 51-83222M59 with the Motorola Part Number 51-82760P02, if it has a date code of QQ8452 or later. (See Fig 2). No lead trimming is required.

Equipment shipped in June 1985 or later should not require rework. No capacitor changes are required, whether or not they were done per PSD 545.

Parts can be obtained from Motorola National Parts depot at no charge by referencing this bulletin.

Labor up to 1/2 hour per board will be covered under warranty using the standard RO-19-21 claim form and referencing this bulletin Number 559.

FIG. 2





TO: PSD MAILING LIST

FROM: ERIC DILLEY

PSD BF009

PAGING PRODUCTS

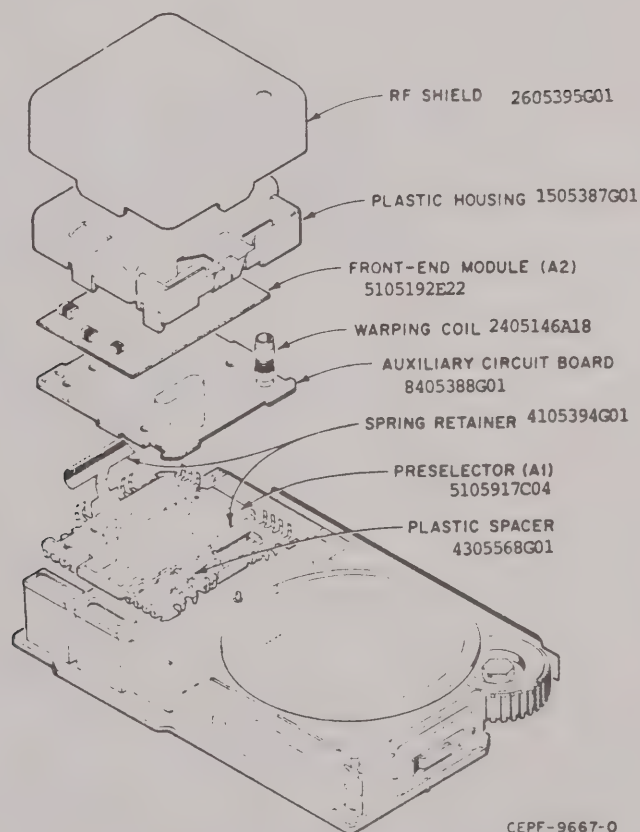
APC 410

INFORMATION ONLY

JAN. 2, 1986

SUBJECT: DIMENSION IV 800 MHZ FRONT END ASSEMBLY

THE MANUAL (68P81016C95) DOES NOT CLEARLY STATE THE PART NUMBERS FOR THE FRONT END MODULE ASSEMBLY. A DIAGRAM IS LOCATED ON PAGE 17 OF THE MANUAL.



CEPF-9667-0

*Front-End Module Assembly*

*Eric*

ERIC DILLEY

PRODUCT SERVICES

BOYNTON BEACH, FL. (305) 738-2206



PSD BF 006  
PAGING PRODUCTS  
APC 616  
INFORMATION ONLY  
DATE: JAN. 2, 1986

TO: PSD MAILING LIST  
FROM: GUY WATSON

SUBJECT: GSC & POCSAG ILLEGAL CODES

THE CODES LISTED ARE NOT TO BE USED. THEY ARE ILLEGAL.

POCSAG

0000000-0000007  
2007664-2007671  
2045056-2045063  
2097144 & GREATER

GSC

CERTAIN GSC CODES ARE INVALID AND MUST BE SKIPPED WHEN ASSIGNING CODES. THE FOLLOWING COMBINATIONS LISTED BELOW REPRESENT INVALID GSC CODES, BUT ANY OTHER COMBINATIONS OF SIX DIGITS FOR BATTERY SAVER OR "N" PLUS FIVE DIGITS FOR NON-BATTERY SAVER REPRESENT VALID GSC CODES.

CODE DESIGNATION

(N) G<sub>1</sub> G<sub>0</sub> A<sub>2</sub> A<sub>1</sub> A<sub>0</sub> (NON- BATTERY SAVER)  
I G<sub>1</sub> G<sub>0</sub> A<sub>2</sub> A<sub>1</sub> A<sub>0</sub> (BATTERY SAVER)

---

IF G<sub>1</sub> G<sub>0</sub>  
EQUALS                      THEN DO NOT ALLOW A<sub>2</sub> A<sub>1</sub> A<sub>0</sub> TO EQUAL

---

00-49            000, 025, 051, 103, 206, 340, 363  
                  412, 445, 530, 642, 726, 782, 810  
                  825, 877

---

50-99            000, 292, 425, 584, 631, 841, 851

---

FOR "N" CODES - NON-BATTERY SAVER SYSTEMS G<sub>1</sub> G<sub>0</sub> SHOULD NEVER EQUAL 40 OR 90 REGARDLESS OF VALUE ASSIGNED TO A<sub>2</sub> A<sub>1</sub> A<sub>0</sub>.

ERIC DILLEY  
PRODUCT SERVICES  
BOYNTON BEACH





# Product Services Bulletin

PSD # 560  
APC 277  
DEADLINE 12-31-86

Date: January, 1986

Memo To: Area Service Managers

cc: Area Field Technical Representatives  
Motorola Hi-Tech Center  
NSO School

From: Don Lobdell

Subject: DEFECTIVE UP-DOWN COUNTERS ON THE IRB BOARD

Models Affected: T1958A T4051A T4052A T5076A

Kits Affected: TRN8662A

Inbound Recovery Boards (IRB's) built between about October 1982 and the present may have an intermittent failure to decode. This problem is exhibited by the board having difficulty decoding a mobile's ISW within a reasonable number of retries, even under full quieting. Occasionally the mobile will output inappropriate out-of-range tones because the IRB cannot decode it's ISW.

The fault has been traced to a particular mask version of the Texas Instrument's SN74LS169BN up-down counter IC. This chip has a Motorola Communications Sector burn-in part number of 5184561L50. It is used on the IRB in two locations: U16 and U18.

To determine if the parts used in U16 and U18 are suspected bad, first check if the 61L50's are manufactured by Texas Instruments. This can be determined by looking for the Texas logo on the I.C. No Motorola manufactured devices have been found to exhibit this problem. Next, examine the datecode found in the upper right corner of the IC. Bad chips will have an "A" in the datecode. Some datecodes known bad are 432AF, 332A, 233A, and 334A.

It is recommended that if the IRB seems to be exhibiting this intermittent failure to decode problem, and uses T.I. 61L50's with and "A" in the datecode, the chip(s) should be replaced with either Motorola parts, or T. I. parts with a "B" in the datecode, for example 510B.

(over)

We recommend that these P.C. boards be repaired at the Hi-Tech Service Center because of the difficulty of checking for proper performance after this rework. Boards that have parts with bad date codes should be sent to the Hi-Tech Service Center at 1335A N. Basswood Dr. Schaumburg, Il. 60195 for rework and re-test.

Costs incurred by the service shop are compensated as indicated in the Labor Warranty Claim Guideline under "depot repair programs". Labor not to exceed 3/4 hour per each board for parts change and retest is authorized to the Hi-Tech Service Center and can be charged to warranty using the standard labor warranty claim form, #RO-21-19B. Reference must be made to this bulletin number on the SP authorization number line and include the model number and serial number for each system. Authorized Motorola Service Centers can also charge travel time to warranty using this same warranty claim form.

Parts can be obtained at no charge from National Parts Department when referencing this PSD bulletin number until December 1986.

TO: PSD DISTRIBUTION

FROM: ERIC DILLEY

SUBJECT: VHF BPR DISPLAY CAPACITOR

CHANGE FOR INTERMITTENT PAGE

PSD BF 010

PAGING PRODUCTS

APC: 615

JAN. 2, 1985

INFORMATION ONLY

MODELS AFFECTED: A03BGB4661, A03BGC4661

A03BGB5661, A03BGC5661

WHEN PERFORMING MAINTENANCE ON THE ABOVE MODELS, C28  
(P/N: 2382397D05) [4.7 uf] SHOULD BE CHANGED TO P/N: 2382397D58  
[1.0 uf]. THIS CHANGE COULD RESOLVE SOME INTERMITTENT PAGE  
PROBLEMS IF THE RADIO IS BEING USED IN AN AREA WITH ACTIVE  
ADJACENT CHANNELS.

THIS INFORMATION PERTAINS TO SERIAL NUMBERS PRIOR TO 615BKYxxxx.  
THE REPLACEMENT PART FOR C28 (P/N: 2382397D58) CAN BE ORDERED  
FROM C&E PARTS AT NO CHARGE BY REFERENCING THIS PSD, MODEL  
NUMBER AND SERIAL NUMBERS OF PAGERS INVOLVED. NO LABOR IS  
BEING OFFERED.



ERIC DILLEY

PRODUCT SERVICES

BOYNTON BEACH, FL. (305) 738-2208





PRODUCT SERVICES DEPARTMENT  
PAGING

PSD BF-001  
JULY, 1985

PHONE: (305) 738-2208  
DITEL: 525-2208

RETURN ADDRESS:  
MOTOROLA, INC.  
1500 N.W. 22ND AVE.  
BOYNTON BEACH, FL.  
33436  
ATTN: PRODUCT SERVICES DEPT.

GUY WATSON, SR. SUPERVISOR (2213)  
MAGGIE KIELBLOCK, EXPEDITOR (2208)

JOE MANN (2206)

SUBSCRIBER PAGING:	PRODUCT	PRODUCT CODE
	PAGEBOY II "CAC"	238
	METRO PAGEBOY "MAC" "LAC"	249
	METRO PAGEBOY "TEC"	234
	METRX "AGC" "BHC"	416
	BPR 2000 TONE & VOICE	406
	BPR 2000 TONE ONLY	614
	BPR 2000 DISPLAY	615
	SENSAR	252
	ENVOY	616
	SENSAR DISPLAY	283

PRIVATE PAGING:

DIMENSION IV & SPIRIT	410
OPTRX	444
PAGEBOY II (FNC)	259
PAGECOM & DIRECTOR	248
ALERT MONITOR	237
MINITORS	233
DIMENSION 1000 "900 MHZ"	489
DIMENSION 2000 "900 MHZ"	635
PAGEBOY III	413
PAGER EXTENDED WARRANTY PROGRAM	R-150-R209

LARRY SAPERSTEIN (2207)

PAGING SYSTEMS	ENCODERS - MODEN 900,6,36,100,PLus (E08)	235
	TERMINALS _ MODAX 100, 500, 500A PLUS UNI	445
	METRO 200	257



# Product Services Bulletin

PSD #544 A  
APC #609  
DEADLINE DATE: N/A  
JULY, 1985

MEMO TO: Area Service Manager

CC: Area Field Technical Representatives  
NSO School

FROM: Jim Langerman

SUBJECT: REWORK OF DATA IF 4-POLE FILTER. MODEL NUMBERS: GEMINI  
C55WNB0107A, C05WNB0107A

A number of Data IF modules have been returned to Hi-Tech Center for poor sensitivity problems. The loss is typically 3 to 10dB more than current filters. It has been found that several of these modules have an older type of front-end filter. That filter was changed (widened) to optimize its performance over temperature. Stations shipped during December 1983 or before could have this older type filter. Stations with serial numbers less than 609CHY0032 or Data IFs with serial numbers less than 308 are suspect.

The sensitivity specification was changed on this module in October 1984 from -107dBm to -111.5dBm to insure optimum sensitivity balance in both IF branches. Therefore earlier Data IFs that passed the -107 spec may now fail the -111.5dBm spec. Data IF modules with -107dBm sensitivity still meet the base station specification of -116dBm (for less than 1% BER) due to the presence of front end gain.

## Repair/Rework

In the interest of commonality of test, Hi-Tech Center is authorized to rework returned Data IFs and FRUs with the older front-end filter. Suspect serial numbers are listed above. Rework time is not to exceed 1/2 hour. \*\* (1 hr.) \*\*

Motorola Service Centers are not authorized to rework field stations unless such rework is confirmed to be required to correct a station sensitivity problem due to the old filter. Inspection could be done during routine maintenance or outage service calls. Repair, if required, would be implemented by using customer spares (FRU replacement system). One half hour maximum per station (no travel) would be authorized.


PLEASE NOTE THE FOLLOWING CHANGES

\*\* REWORK TIME IS NOT TO EXCEED 1 HOUR. \*\*





# bulletin

 **MOTOROLA**  
COMMUNICATIONS AND ELECTRONICS, INC.  
A SUBSIDIARY OF MOTOROLA, INC.

## SERVICE AND REPAIR NOTES

### NUMERICAL AND CLASSIFIED INDEX

July, 1985

The index of Service and Repair Notes (SRN) contains the list of current bulletins on servicing and modification of radio equipment. It is divided into three parts as follows:

1. SRN NUMERICAL INDEX — a listing of bulletins published during the last 10 years in numerical order.
2. SRN CLASSIFIED INDEX No. 1 — a listing of bulletins issued before 1981 and classified by type of equipment.
3. SRN CLASSIFIED INDEX No. 2 — a listing of bulletins issued after January 1, 1981 and classified by Accounting Product Codes (APC).

Because of a duplicity in application, the same SRN may be listed in more than one Classified Index Category.

#### NOTE

\*Indicates a new SRN since the last index.

These indexes supersede those published previously.

## SRN NUMERICAL INDEX

July, 1985

<u>SRN NO.</u>	<u>DATE</u>	<u>SUBJECT</u>
668	3/76	Eliminating Frequency Shifts of <i>Micor</i> Mobile Radios Used with <i>Systems 90</i> Accessories
669B	9/79	Field Repair and Tune-Up Procedure for the UHF <i>Micor</i> Antenna Switching Network
683	11/76	High Band <i>Compa-Station</i> Repeater Radios Potential Transmitter Spurious Output
684	1/76	<i>Micor</i> Audio Board Modification
690A	9/78	Improvement of Voltage Controlled Oscillator in <i>PULSAR</i> Mobile Radios
697	2/76	Circuit Modification Requirements for Substitution of I-F Detector Module A4 in VHF <i>Pageboy</i> Radio Pagers
698	2/76	Replacement of 17.9 MHz Filters and the I-F Amplifier and Regulator Module in A03TEC Series Binary Digital Radio Pagers
701	2/76	Improper Installation of Capacitor in <i>Super Console</i> Radios
702	3/76	Interchanging Models TLN1081 and TLN11082 Channel Elements in Low Band <i>Motrac</i> Radios
703	1/76	Coronary Observation Radio Telephone Acoustical Coupler
704	1/76	Coronary Observation Radio Telemetry Control Console Improvements
705	2/76	<i>Converta-Com</i> Console Improvement
706A	2/76	Circuit Modification Requirements for Substitution of I-F Detector Module A4 in VHF A03DNC <i>Pageboy II</i> Radio Pagers
707	4/76	<i>Modax</i> 500 Radio Paging Terminal Interface with Motorola Exchange Adapter
708	5/76	PT400 Power Amplifier Replacement
709	5/76	L08ENC Encoder Replacement Buttons
712A	1/77	<i>Converta-Com</i> Front Cover Field Modification
713A	2/78	<i>Handi-Com</i> Charging Contacts
715	4/76	Noise Falsing of Model TLN4294B <i>Private-Line</i> Decoder when Used with <i>Micor</i> Radio Sets
716	4/76	Fuse Protection Insulator for <i>MX300</i> Series Radio
717	6/76	Reduction of <i>Digital PL</i> Audio Hum in 132-174 MHz Local Control <i>Micor</i> Base Station
718	5/76	Circuit Modification Requirements for Substitution of Audio Module A5 in <i>Pageboy II</i> Radio Pagers
719	6/76	<i>MX300</i> VCO and PLL Module Incompatibilities
720	6/76	Modification of QLN5366A Receiver Quieting Sensitivity (RQS) Module on <i>Micor</i> Base Station
721B	9/76	Circuit Modification Requirements for Substitution of Q-1 in UHF Paging Receivers
723	1/77	<i>Pagecom</i> Group Call Lockout
724	7/76	Power Flex to Channel Element Short protection for <i>MX300</i> Series Radios
725	8/76	Service Information for <i>MX300</i> 7 Hour Battery Chargers
726	9/76	Modification for Increased Modulation Sensitivity

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727C	9/78	Control Line Voltage (VCO) Shift in VHF <i>PULSAR</i> Mobile Radios Due to Temperature Variations
729	10/76	<i>Metro-Page</i> 1, 2, and <i>Modax</i> 500 Paging Terminal Noise Squelch Circuit Disable
730A	12/76	<i>MX300</i> Battery Charger Series Information
774	10/76	<i>Metro-Page</i> 1, 2 and 3 <i>Modax</i> 500 Paging Terminal Input Module Noise Spike Suppression
775A	10/76	<i>Modax</i> 500 Paging Terminal Extender Card Rework
776	10/76	PT400 and C.O.R. Rapid Charger
778A	1/77	Tune-Up Channel Elements for Wide Channel Separation
779	1/77	Physical Placement of <i>Micor</i> Radio Microphones
780	11/76	<i>MX300</i> VCO Bandsplit
781A	10/82	<i>Moden</i> 900 Paging Encoder
782	1/77	Interface of <i>Micor</i> Base Station with T1820A Series <i>PULSAR</i> Control Terminals
783	2/77	Squelch Pop Improvement on <i>MX300 Converta-Com</i>
784	2/77	<i>MX300</i> RF Power Amplifier Regeneration Modifications
785	5/77	Tuning Procedure Revision for VHF <i>PULSAR</i> Mobile Trisolector
786	2/77	<i>MX300</i> Microphone Cartridge Replacement
787	2/77	<i>MX300</i> Control Flex Replacement
788	2/77	<i>MX300 Converta-Com</i> Console Side Connector Replacement
789	2/77	VHF <i>HT-220</i> First Oscillator Transistor Change
790	2/77	Accepted Cleaning Agents and Adhesives for use on the <i>MX300</i> Portables
791	3/77	Random Shutdown Prevention and Fuse Flowing on <i>Consolette</i> Base Power Supply
792	3/77	Alert Tone Lock-up <i>Minitor Director Pagecom</i>
793	6/77	A1 Module Compatibility in <i>Metro Pagers</i>
794	3/77	<i>MX300</i> Audio Filter and Regulator Module Replacement
795	6/77	Voltage Regulator Change on <i>MX300</i> Battery Chargers
796	7/77	<i>MX300</i> Battery Charger Hardware Change
797	7/77	<i>MX300</i> Potential Back Cover Short
798	8/77	Preselector Regeneration on VHF <i>MX300</i>
799	8/77	<i>Pageboy</i> II and <i>Metro Pageboy</i> Transducer Polarity
801	7/77	Intermittent operation on <i>MX</i> Portable Due to Defective Module Sockets
802	7/77	<i>MX300</i> Battery Contact Lockwasher Replacement
803	8/77	<i>MX300</i> UHF Multiple Frequency Flex Explanation
804	10/77	Improved Maintenance Schedule for Dasi Paper Punches in <i>PULSAR</i> Mobile Telephone Terminals
805	8/77	Ferrite Bead Change to Eliminate <i>MT500</i> UHF Standby Current Drain
806	9/77	<i>Pageboy</i> A01CAC Housing



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809	9/77	<i>MX300</i> Microphone Modification for High Noise Environment
810	9/77	Falsing on Airborne Selcal Decoder NA136
811	9/77	<i>MX300</i> PTT Actuator
812	10/77	Mercury Battery Compatibility for the "A" Version <i>MX300</i>
816A	5/78	<i>Pageboy II</i> , <i>Metro</i> , Binary and <i>Metrxx</i>
817	11/77	<i>MX300</i> Defective Squelch Control Knobs
818A	9/79	<i>Pageboy II</i> and <i>Metro Pageboy</i> Three Position Switch Revision
821	3/78	<i>MX300</i> Constant Transmit when using Time-Out-Timer Option (H901)
822	5/78	<i>MT500/HT220</i> Speaker Insulator
823A	10/79	<i>Metro Pageboy/Pageboy II</i> Cover & Clip Roll Pin Flaring Tool
824A	8/78	<i>MT500</i> Universal Model (BBU) PTT Replacement
825	5/78	Alternator Whine and Intermittent Parasitic Radiation Being Transmitted
826	5/78	Mobile Antenna Bushing Assembly/Coax Center Conductor
827	5/78	Available Service Aid Extender Card for Base Station Using Plug-in Modules
828A	8/78	<i>MT500</i> Service Information
829	5/78	75-Watt UHF Power Amplifier Output Capacitor Improvement
830	5/78	Power Supplies 30 Amp Fuse Failures
831	5/78	High Band Mobile <i>Micors</i> with Wide Space Receiver Experiencing Self-Quieting
832	6/78	"N" Cell Battery Replacement for Silent Alert/Vibra Page Pagers
835	6/78	Universal Side Connector Breakage
838	5/79	<i>PT500</i> Power Pack Compatibility
840	10/78	Modifications to Control Terminal Input/Output Trunk Board to Prevent Overdissipation
842	10/78	<i>MT500</i> Shielded Coax Cutting Instructions
843	11/78	Revised Neutralization Procedure for VHF IMTS Base Stations
844	1/79	Simultaneous Signaling (2850 Hz) and Voice on Same Channels used in Secode <i>SMART</i> SYSTEMS
845	12/78	Power Amplifier Improvement for UHF Car Telephone Radios
846	1/79	<i>MT500</i> Power Amplifier Hold Down Stud
847	1/79	<i>MX300</i> Series <i>Handie-Talkie</i>
848	1/79	<i>PULSAR II</i> Mobile Telephone Control Head RF Interference, Audio Feedback and Auxiliary Alarm Function
849	12/78	Possible VCO Control Line Drift Over Time with VHF <i>PULSAR</i> Mobile
850	1/79	<i>Metro-Page 1, 2 &amp; S</i> Radio Paging Terminals Tone Generator and Alarm Board Circuit Modification
851	1/79	Correction of A01AGC <i>Metrxx</i> Paging Sensitivity Correlation Specification
853	3/79	<i>Minitor, Director, Pagecom</i> Voice Falsing

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856	6/79	Modified General Encoding Method for Radio Pagers
857	7/79	Detuning and Sensitivity Problem of AO1AGC <i>Metrix</i> Pager
858	7/79	<i>Modax</i> 100 and <i>Modax</i> 500 ASI Cycle Time Change
859	8/79	Expedient Back-up Repair for <i>PULSAR</i> Mobile Radios
861A	9/82	<i>MT500</i> Portable Replacement Assemblies
862A	9/79	AO1TEC Metro Binary Sensitivity Problem
867	11/79	Potential "Channel Skip Problem" with VHF and Mark VII <i>PULSAR</i> Mobiles
868A	8/83	C & E Parts Support of After Market <i>DVP</i> and <i>DES</i> Module Program
869	11/79	Channel Switch Interblock for Unused Channels in VHF <i>PULSAR</i> Radios
870	11/79	Escutcheons for Vertical Installations of <i>PULSAR 100</i> Control Heads
871	10/79	Servicing Aid for Possible Spurious Output Degradation on <i>PULSAR</i> Mark VII Mobiles
872A	12/80	Special Repair Service for UHF & VHF <i>PULSAR</i> Mobile Modules
874	12/79	Improved Audio Integrated Circuit for <i>Maxar</i> , <i>Maxar 80</i> and <i>Moxy</i> Radios
875	12/79	Elimination of <i>Mitrek</i> Channel-Scan Buzz
876	12/79	<i>Mitrek</i> Tone Private-Line Encoder/Decoder Improvement
880	12/79	<i>Metrocom</i> I Control Head Improvement
881A	8/80	Reliability Improvement for Fully Automatic Control Terminal, Power Inverters
882	3/80	Choke Lead Breaking on 800 MHz <i>Micor</i> Mobile Radios
884	5/80	Possible Transistor Failure in VHF <i>PULSAR</i> Mobile Radio
886	2/80	Intermittent Cradle Hang-Up Switch in Series-80 Desk Top Controllers
888	3/80	Improved Transistor Reliability for Low Band, Low Power, <i>Mitrek</i> Radios
889	3/80	Tone Signaling and Voice Simultaneous on Same Channel Used in 2805 Hz RCC Manual Systems
890	5/80	<i>PULSAR 100</i> Control Head Improvements and Functions
890A	12/80	Revisions for SRN890
891	2/80	Paging Products Code Plan Limitations of 1000 and 1100 Series Cap Codes Utilizing Code Tone Groups 10 and 11
892	4/80	Contacts for Technical Assistance and Information for Telephone Systems and Products
893	4/80	Special Repair Service for I-F Filter Module Used in UHF <i>PULSAR</i> Radios
895	8/80	Test Equipment Considerations for <i>Mitrek/Mocom 70</i> Radios
896	5/80	Elimination of Noise, Caused by DC Power Inverters, on <i>PULSAR</i> Fully Automatic Control Terminal
898	8/80	<i>Metrix</i> Code PlugSockets

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900	5/80	<i>PULSAR</i> Control Terminal Improvements for DAS Alarms and Multi-System 8-Channel BSI Operation
901	6/80	Improving Final Device in Low Band 60 Watt <i>Mitrek</i> Mobile Radios
902	8/80	Installation of Front Plug Gasket on <i>Mitrek</i> Radios
904	7/80	Method for Locating Fractures in Substrates
905	8/80	Low or Distorted Audio in <i>PULSAR</i> VHF Mobile Radiotelephones
906	10/80	Proper Testing and Troubleshooting of <i>Mitrek</i> Receiver Audio Output Circuit
907	11/80	Potential Power Out Failure Due to Inadequate Parts/Wire Clearance in 806-821 MHz <i>Micor</i> Radios
908	9/80	Proper Maintenance Procedure for Interconnecting Plug-In Pins on <i>Micor</i> Mobiles, Data Communications Systems (BLU) and Base Stations
909	1/81	Substitute Replacement for the Final Amplifier Tube in IMTS, MJ, and MK Base Stations
910	2/81	Potential ANI System Compatibility Problem With Radiotelephones
911	1/81	Radio Installation in Late Model Cadillacs
913	2/81	N1248A CVC Console Adjustable Pawl Addition/Readjustment With Safety Wire and Console General Maintenance
914	10/80	Test Procedure for <i>Moden 900</i> Power Transformer (T1)
915	11/80	<i>HT220 Touch-Code</i> Radios (Special Precautions Pertaining to DTMF Decoders)
916	11/80	Instantaneous Deviation Control Change on HT210/220 Portables
918A	1/82	New Second Oscillator Crystal for VHF and UHF <i>MT500</i>
920	3/81	Special Repair Service for Voice Security System Unit, Code Inserter
921	8/81	Degradation in Tuning of UHF <i>Mitrek</i> Radios
922	3/81	Pocket Transmitter Microphone Information
923	4/81	Special Repair Service for Trunking Systems Central Controller Modules
924	4/81	Front End Instability Problem on A03AGC <i>Metrax</i> Pager
925	5/81	Frequency Drift of Subcarrier Tone on Emergency Medical Service Radio System
926	5/81	RF Interference in <i>Micor/Mitrek Systems 90</i> Electronic Siren and Public Address System
927	5/81	Low Battery Voltage Ringing With VHF <i>PULSAR</i> Radiotelephone Using MACS
928	6/81	<i>MT500</i> Channel Element Twist Pin Soldering
929	6/81	<i>MT500</i> Digital <i>Private-Line</i> Product Improvement
931	7/81	<i>MT500</i> Plated Brass Control Knobs



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932	8/81	Code Plug Orders and Control for <i>Micor</i> and <i>SYNTOR X</i> Trunked Communications Systems
933	8/81	Auxiliary Alarm Falsing With <i>PULSAR II</i> Mobile Telephones
934	8/81	Improvement in PTT Operation of Security Transmitters
935	8/81	Hotline Setup and Update Information for the 800 MHz Trunked Fixed System Equipment
936	8/81	Additional Shock Protection for the U4 Receiver Detector Module ( <i>MT500</i> )
937	9/81	HT210/HT220 Instantaneous Deviation Control (IDC)
938	10/81	Possible Short Circuit With MACS Retrofit Kit for Early Version VHF <i>PULSAR</i> Radiotelephone
939	10/81	Low and Distorted Audio on the N1248A <i>Converta-Com</i> Console
940	12/81	Splatter Filter Failure in <i>DVP</i> Mobiles, Voice Security Systems
941	11/81	Safety Notice for Radio Installations in LP Gas Vehicles
942	10/81	<i>MT500</i> On/Off Switch and Volume Control
943	12/81	Safety Notice for Radio Installations in LP Gas Vehicles
944	12/81	Clarification on Use of Vehicular Speaker Phone ( <i>V.S.P.</i> ) in Manual Mode
945	1/82	<i>Modax 100</i> Power Supply Modification
946	1/82	Vinyl Cabinet Surface Stickiness
947	2/82	FCC Issuance of General Radiotelephone Operator License
948	2/82	Trunked <i>SYNTOR X</i> Positive Ground Radios (Non-Operative)
949	2/82	Oil Filled Transformers, Capacitors and Electromagnetic Containing PCB's (Polychlorinated Biphenyls)
950	3/82	Trunked Mobile <i>SYNTOR X Quik-Call</i> Modification for Individual Call Option
951	3/82	Noise Problems With Radiotelephone Equipped with <i>V.S.P.</i> Feature
952	3/82	<i>Modax 500</i> Paging Terminal Test Board
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# bulletin

SRN CLASSIFIED INDEX NO. 1  
(CLASSIFIED BY TYPE OF PRODUCT)

July, 1985

**NOTE**

This index includes SRN's published before January 1, 1981 and is classified by type of equipment. All SRN's originated after January 1, 1981 are classified by equipment Accounting Product Codes (APC) in Index No. 2.

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# Product Services Bulletin

PSD #542

APC #474-574

DEADLINE DATE: 12/31/85

MEMO TO: Area Service Manager

CC: Area Field Technical Representatives  
NSO School

FROM: Jim Langerman

SUBJECT: MSF 5000 MULTI-CODED SQUELCH FALSING

Some TRN5180A MCS boards (shipped prior to 1-1-85) may have a defect in the oscillator circuit when cold. This condition can cause false hardware DPL detect and momentarily key up the station. The station dekeys on failure to detect code with the software after DOD (drop out delay).

## MODELS & KITS AFFECTED

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QLN2237A	RETROFIT KIT
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C369AA	MCS OPTION
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The boards prone to falsing have chip cap C1467 = 20pF (marked H1). If the MCS boards exhibits this repetitive falsing, a 47pF NPO disc cap (PT # 21-83406D83) should be soldered between pins 1 & 7 of U1412.

One hour labor plus travel will be accepted by any authorized MSS/COMSS on radios with S/N dated before 1-1-85. It is suggested though when ever possible that the capacitor can be changed out during routine maintenance.





# Product Services Bulletin

PSD #545

APC #281

DEADLINE DATE: 12-31-85  
JUNE, 1985

MEMO TO: Area Service Manager

CC: Area Field Technical Representatives  
NSO School

FROM: Don Lobdell

SUBJECT: STARPLEX MULTIPLEX SYSTEM, VOLTAGE REGULATOR  
IMPROVEMENT

MODEL AFFECTED: M1099A, M1100A, M1106A, M1108A

KIT AFFECTED: MLN6287A CHANNEL MODEM

Recent field reports indicate that the -18 volt regulator (U20), on the MLN6287A Channel Modem, may exhibit a failure mode upon initial turn on. To assure proper operation of the -18 volt regulator (U20), it is recommended that mylar capacitor C42 (.22uf) be replaced with a 22uf electrolytic capacitor, part number 2311019A29. This correction largely affects channel modems shipped from June of 1984 to March of 1985 whose -18 volt regulator has a date code later than 8401 (first week-1984). The date code is stamped on the body of the regulator device which is mounted to the card frame at the rear of the channel modem (Refer to FIG 1). -18 volt regulators obtained for replacement or spares, with a date code later than 8401, will also require this capacitor change. Channel modems shipped after April 1st 1985 already have this capacitor change incorporated.

## 1. MODIFICATION TO THE MLN6287A CHANNEL MODEM

Remove part C42, a large orange .22 uf capacitor which is located at the back edge of the board.

Replace C42 with a 22uf/50v electrolytic capacitor. (Motorola part number: 2311019A29). This part is mounted in the C42 position by forming the negative (-) lead of the component for a 0.5 inch spacing and inserting vertically, with the negative lead toward the fuse (F1), into the printed circuit board.



PARTS REQUIRED

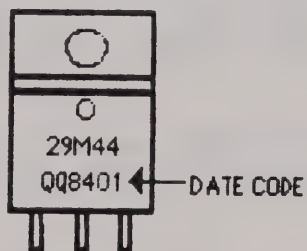
MOTOROLA PART NUMBER  
2311019A29

DESCRIPTION  
22uf.50v Electrolytic capacitor

The replacement capacitor (2311019A29) may be obtained from C & E MOTOROLA at no charge.

Any questions call Don Lobdell (Product Services) 312-576-6244  
or ditel 736-6244

FIG. 1



PARTS REQUIRED

Regards,

*Don Lobdell*





# PRODUCT SERVICES BULLETIN

PSB# TX85014

September 12, 1985

To: Distribution

From: Bob Humphrey

Subject: Acoustic Regeneration (Howling) in Mostar/Traxar 800 MHz Trunked Radios

A final fix has been developed for acoustic regen. The following procedures eliminate the tendency for some Mostar/Traxar radios to exhibit mechanically coupled audio feedback (acoustic regen).

1. Remove plastic covers from radio and remove the 9 screws securing the trunked command board (HLF4062, HLF4065 or HLF4080) to the chassis.
2. Remove the 14 screws securing the bottom synthesizer cover to the radio and remove the cover. This is the cover with the sticker that reads "Warning - tuning slugs L1-L9 are not field adjustable".
3. Fold trunked command board open and remove the 8 screws that secure the component side cover in place and remove the cover.
4. Inspect Q1250 for excessive lead length. If necessary, unsolder all 3 leads of Q1250 and dress the transistor so that the top of the transistor is no more than 1/4 inch from the PC Board. Resolder and trim off excessive lead length.
5. Reinstall the bottom cover using all 14 removed screws. Torque to 8 in. lbs.
6. Reinstall the component side cover using 7 of the 8 screws, omitting the screw located in the center of this cover.
7. Install the stand off (P/N 43-80288K01) in the hole that was previously occupied by the center cover screw (see Fig. 1). Tighten securely. If the T10 torx screw is installed in the top of the stand off, remove it.
8. Fold trunking command board back into place (connect plug at rear of board) and install 9 screws previously removed.
9. Turn the radio over and install the screw that was removed from the top of the stand off thru the hole in the main board and into the top of the stand off. Tighten securely.
10. Reinstall plastic covers and return unit to service.



# PRODUCT SERVICES BULLETIN

Removal and installation of this number of screws can be more easily facilitated by the use of the cordless screw driver (01-80320B28) and a T10 torx bit (66-80321B83). When the torque selector on this screw driver is set to 2 1/2, an acceptable torque will be applied to these screws.

This bulletin is applicable to Mostar/Traxar radios manufactured before 8-15-85.

The stand off and screw can be obtained from C&E Parts at no charge by ordering part numbers 43-80288K01 and 03-10907A18. On ordering, include the model and serial number of the applicable radio and reference this Product Service Bulletin.

This PSB replaces PSB TX85007 which should be removed from your files and discarded.

Bob Humphrey  
Mostar Product Services  
Ft. Worth, TX

/plw





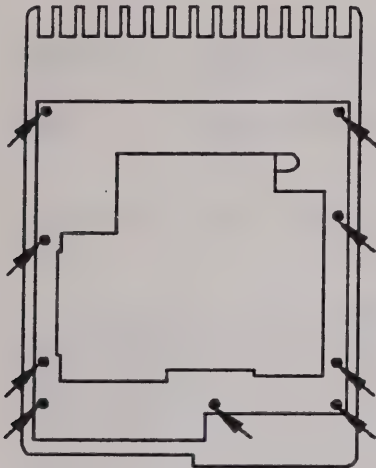


**MOTOROLA**

TO INSTALL SPACER AND SCREW:

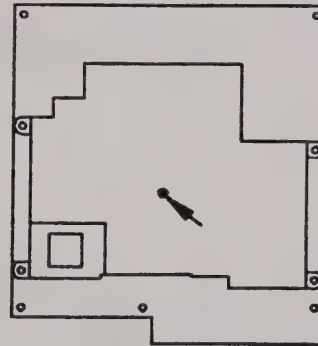
MOSTAR / TRAXAR  
800 TRUNKED

STEP 1:



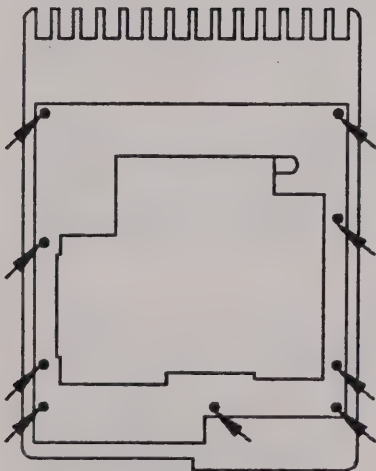
REMOVE NINE SCREWS  
FOR TRUNKED COMMAND  
BOARD.

STEP 2:



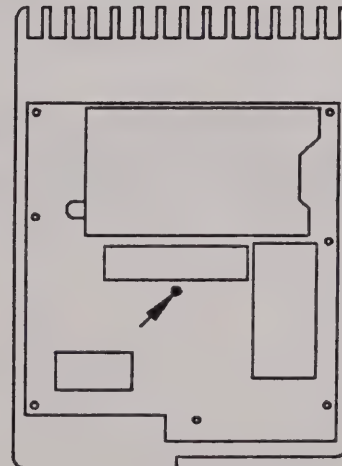
OPEN UP RADIO AND TURN  
TRUNKED COMMAND BOARD  
COMPONENT SIDE UP AS SHOWN.  
REMOVE SCREW AT CENTER  
OF SYNTHESIZER TOP COVER  
AND REPLACE WITH SPACER  
(43-80288K01).  
TORQUE TO 9-10 IN-LBS.

STEP 3:



REINSTALL NINE SCREWS  
THROUGH TRUNKED COMMAND  
BOARD.

STEP 4:



INSTALL ONE SCREW  
(03-10907A18)  
THROUGH MAIN BOARD  
INTO FEMALE THREADS  
IN SPACER. TORQUE  
TO 6-8 IN-LBS.

CAUTION: TO PREVENT STRIPPING FEMALE THREADS IN SPACER,  
SCREW SHOULD BE STARTED WITH FINGERS AND THEN  
TIGHTENED.





**MOTOROLA INC.**

PSD F-310  
APC 258/358

DEADLINE DATE: December 31, 1985

MEMO TO: PSD Mailing List

DATE: May 22, 1985

FROM: Greg Sadler

SUBJECT: Apcor Voltage Regulator Failures

A redesign of the Apcor Ni Cd battery connector in April 1983 (battery date code 1383 or later) has introduced a potential problem that requires field notification. The connector redesign is such that it is possible to insert the plug incorrectly if excessive force is applied or if the plug pins are loose due to unusually rough handling. If the plug is inserted incorrectly into the battery and the Apcor is subsequently turned-on the voltage regulators will fail. If the Apcor is already turned-on during battery changing, it is also possible to make a momentary reverse polarity connection while attempting to insert the plug; and as before the voltage regulators will fail.

A modification kit to attach a plug pin guide to the battery and to attach a stiffening plate to the battery plug is being made available through Product Services. To determine if you need the kit, check the plug receptacle in the battery. If it is black and is flush with the top surface of the battery, it should be modified. Batteries shipped from the factory after May 1985 (batteries date code 2385) will be modified with no further changes needed.

To obtain this modification, contact your local Motorola Service Representative or Motorola Service Station. Parts and 1/2 hour labor will be made available to your local Motorola Service station through Product Services (305) 475-6173.

Greg Sadler  
Product Services,  
Plantation

GS/bjg





# PRODUCT SERVICES BULLETIN

PSB# TX85013

September 12, 1985

To: Distribution

From: Bob Humphrey

Subject: Mostar/Traxar 800 MHz Trunked RF Deck Repair (Preselector)

This bulletin is designed to eliminate confusion about what can be repaired/replaced in the Mostar/Traxar radios. The RF deck is not tunable or repairable at this time by any field shop. To elaborate slightly, this means that the RF deck cannot be tuned, repaired (in any way), disassembled and/or reassembled or even removed from the main board without being returned to one of the depots for retuning. The RF deck must be tuned while installed in the radio and the PA must be attached to the radio. Send the whole radio (we don't need the code plug or accessories).

As stated in PSB TX85001, the power amplifier board cannot be replaced in field shops due to the fact that the RF deck must be realigned when the PA board is changed. This does not mean that the PA cannot be repaired. The PA module (U600), driver transistor, etc. may be replaced. Only the board (P.C. board itself) cannot be changed without retuning the RF deck.

This bulletin is for informational purpose and authorizes no labor or parts of any kind.

Bob Humphrey  
Mostar Product Services  
Ft. Worth, TX

/plw



# PRODUCT SERVICES BULLETIN

P.S.B. #TX 85011

June 25, 1985

To: Distribution  
From: Lee Webb  
Subject: Syntor-X Scan Drop Out

Syntor-X Engineering group has determined Syntor-X UHF and VHF units can exhibit scan drop out during high signal level fading conditions.

This scan drop out can be eliminated by the addition of a 1.5 micro farad capacitor (P/N 2384538G20) from Q402 collector to circuit board ground on the common circuits board. This capacitor will lengthen the squelch tail and prevent the receiver from squelching up during high signal level fading conditions.

This bulletin is being issued as a service aid only and no warranty time is authorized. Finally, units shipped after May 1985 should already have this feature added. Any problems or questions please call Product Services, Ft. Worth at (817) 232-6242 or Ditel 729-6242.

Thank You,



Lee Webb

/plw





# PRODUCT SERVICES BULLETIN

P.S.B. #TX85015

A.P.C. #603

September 12, 1985

To: Distribution

From: Product Services

Subject: 3 Cell Injection Filter Degradation -  
Mostar/Traxar 800 MHz Trunked Radios

Beginning in February 1985, an increase in the number of Mostar/Traxar 800 Trunked radios returned to the DFW depot for RF deck repair has been observed. The intent of this service bulletin is to:

- Define the cause of the incremental increase
- Define the symptoms that relate to the specific cause
- Size the problem relative to unit exposures and observed failure rates
- Reduce the impact to both the customer and the Motorola Service shops

## Cause:

The advanced manufacturing technology group has determined that the primary cause for the incremental failure rate is due to an accelerated growth rate of "tin" or "spontaneous" whiskers within the RF deck cells. These whiskers are microscopic in size and may not be visible to the human eye. This accelerated growth rate is believed to have been caused by a contaminate in the vendors bright acid tin plating bath.

## Symptoms:

The symptoms that are generic to the defined cause are:

- Initially, customer complains of poor receive sensitivity or intermittent out of range and shop verifies a good meter #5 but a low, no or intermittent meter #3

## Exposure:

The analysis of the units returned to the depot for repair indicates that units shipped between August 1984 and August 1985 may demonstrate this problem. This problem has been corrected in the factory process as of September, 1985. The demonstrated failure rate for the total exposed units has been less than 1/2 of 1 percent (.34%). The actual failure rates per month are listed below in serial number sequences.

HJQ = .217	HJY = .105	HKG = .302
HJS = .745	HKA = .062	HKJ = .541
HJU = .802	HKC = .072	HKL = .248
HJW = .777	HKE = .144	HKN = .116



# PRODUCT SERVICES BULLETIN

## Impact Reduction

In order to reduce the "out of service" time and decrease the flow of radios to the DFW depot, the following procedure is recommended:

1. Verify the meter #3 condition (low, no or intermittent)
2. Using dry-air or freon (Difluorodichloromethane), blow out all 9 cells of the RF deck. This can be accomplished from the tuning slug side of the coils thru the ports provided by the coil form tabs. RF deck disassembly is not required. Note: Do not use any material that may leave a chemical or oil residue.
3. If the following conditions are met, the unit can be returned to service.

Retest unit on all 7 frequencies (internal and customer test mode) and measure for the following parameters:

- \* -12db Sinad greater than .3 microvolts
- \* Better than .4 microvolts sensitivity at 20db quieting
- \* Meter #3 greater than 5 microamps

Any units that will not respond to these specifications must be returned to the DFW depot for further processing to ensure proper spectrum wide alignment. Note: Under no circumstances should any alignment be attempted on any of the RF deck coils.

Based on the results of a control group, it is anticipated that this procedure will reduce the need for depot level processing by 85 to 95 percent for this specific RF deck problem.

Effective 9-15-85 thru 5-1-86, the Product Group will assume responsibility for all DFW depot charges for units that verify this three cell filter problem and do not respond to this recommended procedure. Any evidence of field attempts at RF deck retuning or field repair-or-replacements of the RF deck will void this extended warranty.

Mobile Division  
Product Services





# Product Services Bulletin

PSD #543

APC #228

DEADLINE DATE: 12/31/85

DATE: May 24, 1985

MEMO TO: Area Service Managers

CC: Area Field Technical Representatives  
Motorola C & E Parts  
Motorola High Tech Center  
NSO School

FROM: Vern McKinnon

SUBJECT: CENTRACOM II HEADSET INTERFACE / TELEPHONE CALL DIRECTOR  
VARYING AUDIO XMIT / RCV LEVELS - FIELD MODIFICATIONS  
OPTION KITS - K577AE, K570AB, K704AA

Varying levels with the receive, transmit, and sidetone audio may occur when the K577AE Telephone / Headset Interface option is used with telephone call directors, particularly those different than the BDN6185A that is recommended for Centracom II usage. To resolve problems of this type, a design change has been instituted into factory production units on the BLN6625A Headset Interface Board (K577AE option) and BLN6717A Headset Jack Board (K570AB option). With the design change the DLM operation will be bypassed during telephone operation. As a result, the headset will function as though it were plugged directly into the telephone instrument.

The modifications, with the exception of STEP 6 (see attached), have been incorporated into production shipments effective 5/1/85. STEP 6 will be incorporated into equipment shipping after 6/29/85. Without STEP 6, during telephone operation, transmit audio will not be muted if the operator presses the transmit button.

The design modification for one operator position should take no longer than one hour. Modifying additional operator positions should take no longer than 1/2 hour per position. An additional 1/4 hour is required to modify operator positions with two headset jacks (K704AA). Performing STEP 6 modification only should take no longer than 1/2 hour. Field labor costs including travel time, per the above, will be accepted on warranty claim form #RO-21-19B if reference is made to this field bulletin (as the SP authorization number).

The appropriate customer name, serial number(s), and description, must be provided on the claim form. The serial number is located on the label attached to the handle of the OMI module(s) associated with the modified position(s).

Parts to perform these modifications can be obtained from National Parts Department at no charge, with exception of the wire, if reference is made to this field bulletin.

(over)



## REQUIRED MATERIAL

### QTY\* DESCRIPTION

- 1\* 0611009A85 33K, 1/4 WATT RESISTOR
- 1\* 0611009A79 18K, 1/4 WATT RESISTOR (units that shipped after Feb 85)
- 1\* 0611009A87 39K, 1/4 WATT RESISTOR (units that shipped before Feb 85)
- 1\* 4883654H01 DIODE OR EQUIVALENT
- 1\* 4 INCH 24-26 GAUGE WIRE JUMPER (STRIP 1/4 INCH ON BOTH ENDS)
- 1\* 3 INCH 24-26 GAUGE WIRE JUMPER (STRIP 1/4 INCH ON BOTH ENDS)
- 2\* 2.5 INCH 24-26 GAUGE WIRE JUMPER (STRIP 1/4 INCH ON BOTH ENDS)

\*NOTE: The quantities indicated above are sufficient to modify one operator position only. Multiply times the number of operator consoles to get the total requirement. If any console positions have two headset jacks then an additional 39K, 33K and 18K is required for each.

MODIFICATION PROCEDURE - OPTIONS K570AB, K704AA  
BLN1148A HEADSET JACK ASSEMBLY  
BLN6717A HEADSET JACK BOARD

STEP 1: Remove the PC board from the BLN1148A headset jack by the following procedure: Unplug the ribbon cable connector from the PC board inside the jack housing. Remove the five torx head screws from the sides of the housing. Carefully slide the PC board and jack assembly out of the housing to expose the PC board.

STEP 2: Locate the 100 K resistor R33 on the headset jack PC board (see the board overlay in the 68P81063E60-A Series II Field Maintenance Manual). Replace the 100 K resistor with the 33 K resistor from the parts list above.

STEP 3: Locate the 39 K resistor R14 on the headset jack PC board (see the board overlay in the 68P81063E60-A Series II Field Maintenance Manual). Replace the 39 K resistor with the 18 K resistor from the parts list above. NOTE: On early versions of the Headset Jack, which shipped prior to February 1985, resistor R14 is a 82 K rather than a 39 K. If you have this version, replace the 82 K with the 39 K from the parts list above to achieve the same desired results.

STEP 4: Re-assemble the jack assembly being careful to check the alignment of the two volume control knobs on the bottom of the unit. Plug the ribbon cable connector back into the PC board before mounting the jack under the writing surface of the console.

(over)





MODIFICATION PROCEDURE - OPTION K577AE  
BLN6625A TELEPHONE HEADSET INTERFACE BOARD

- STEP 1: Locate the BLN6625A Telephone / Headset Interface on the Option Panel in the console. Unplug all cables taking care to mark them so that they can be reconnected correctly. Remove the PC board from the panel by depressing the spring tab on the nylon mounting standoffs.
- STEP 2: Locate the 10 K resistor R52 on the PC board. Lift the resistor leg that is closest to the transformer and stand the part up vertically.
- STEP 3: Solder one end of the 4 inch wire jumper to the end of R52 that's standing up. Solder the opposite end of the wire to pin 4 on the DLM Gain Hybrid Z1 taking care not to create any solder shorts. (Note: Pin 1 is indentified on the back of the hybrid)
- STEP 4: Locate and remove 1.0 uF capacitor C13. Solder one end of a 2.5 inch jumper into the hole where the positive side of C13 was soldered. Locate 22K resistor R28 (connected to pin 7 of U5). Wrap and solder the other end of the 2.5 inch jumper to the side of R28 which is closest to the transformers.
- STEP 5: Locate and remove 1.0 uF capacitor C14. Solder one end of the 3 inch jumper into the hole where the positive side of C14 was soldered. Locate 22K resistor R26 (connected to pin 1 of U5). Wrap and solder the other end of the 3 inch jumper to the side of R26 which is farthest away from the transformers. NOTE: R26 is indicated correctly on the board overlay in the 68P81063E60-A Series II Field Maintenance Manual. However, on the schematic it is incorrectly identified as R22. The resistor between U5 pins 1 and 2 should be labeled R26.
- STEP 6: Solder one end of the remaining 2.5 inch jumper to the cathode of the H01 diode. Insulate the soldered joint with shrink tubing or a suitable substitute. Locate 10 K resistor R47 between the transmit level pot and the transformer T1. Wrap and solder the anode of the H01 diode to the side of R47 which is closest to the level pot. Locate 3.9 K resistor R63 between the ribbon cable connector and the screw terminal block. Wrap and solder the free end of the jumper to the side of R63 which is closest to the ribbon cable connector.
- STEP 7: Re-install the BLN6625A Telephone / Headset interface board on the Option Panel and reconnect all cables. The transmit level pot on the board should be adjusted to output approximately -16 dBm peak voice (-26dBm average voice) as measured across pins 5 and 6 of screw terminal P5 with the telephone instrument connected. The receive audio level can be adjusted by the operator using the second volume knob on the headset jack assembly.

(over)



This completes the modification. Test the system to verify correct operation.

NOTE: Most Plantronics Headsets are equipped with a feature called "Sound Guard" which limits the maximum audio level in the ear piece. This feature acts like an AGC amplifier. Several customers have complained that the receive level is too low. Unfortunately, driving this type of headset with a larger signal from the console does not increase the output amplitude and in fact increases only the background noise. The Product Groups are in the process of setting up a new Plantronics Headset, through Drop Ship, which does not have the "Sound Guard" and therefore has louder receive audio. This unit should be available through Drop Ship within 2-3 months.

If the headset in use does not have the AGC circuit and the audio level is still too low jumper JU4, on the BLN6717A board, inside the headset jack should be cut. Jumper JU4 does not exist on versions of the headset jack which shipped prior to February 1985. To increase the level on these early version boards, change the value of the resistor, R24, between pins 1 and 2 of IC U1 from a 10 K to a 22 K. Since this specific modification is a service aid, field modifications to cut this jumper or change this resistor will not be accepted on a warranty claim form.

Regards,

*Yuen McKinnon*





# PRODUCT SERVICES BULLETIN

PSB# TX85012

September 12, 1985

## PRODUCT SERVICE BULLETIN

To: Distribution

From: Bob Humphrey

Subject: Mostar/Traxar 800 MHz Trunked Radios - Helical Resonator Update

The helical resonator in the Mostar/Traxar 800 MHz trunked radios has been redesigned to eliminate problem encountered in previous designs.

The following changes were made to the helical resonator assembly (L1252):

1. Hole enlarged in plastic coil form to eliminate binding of tuning screw.
2. Threaded hole in outer casting was centered over newly enlarged hole in plastic coil form.
3. A post assembly heat soak was instituted (100°C for 8 hours) to insure relaxation of stresses on plastic coil form after insertion into housing.
4. Inverted eyelets are attached to the 2 leads of the coil to relieve strain between the leads of the coil and the solder junction at the printed circuit board.

The redesign coils are identifiable by a green top on the metal housing. This marking is visible even though the component side cover is in place.

These changes represent the final series of design changes that have been implemented on the helical resonator (L1252). The historical failure modes (cracking of solder connections between the coil leads and printed circuit board, tap leads broken off, etc) which have been impacted by previous changes should demonstrate a further improved level of reliability. The necessity to resolder or replace L1252 should be virtually eliminated.

This bulletin is for informational purposes only and specifically does not authorize any parts or labor above normal warranty.

Bob Humphrey  
Mostar Product Services  
Ft. Worth, TX

/plw



# bulletin

**MOTOROLA**

COMMUNICATIONS AND ELECTRONICS, INC.

A SUBSIDIARY OF MOTOROLA, INC.

SRN CLASSIFIED INDEX NO. 2 (CLASSIFIED BY APC CODE)

July, 1985

**NOTE**

This index includes SRN's originated after January 1, 1981 and is classified by equipment Accounting Product Codes (APC). The APC number can be identified for equipment manufactured after January 1, 1978 by the first three digits of the serial number. SRN's published before January 1, 1981 are classified by type of equipment in Index No. 1.

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SRN CLASSIFIED INDEX NO. 2

July, 1985

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# bulletin

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PORTABLE PRODUCTS

SRN - 1032

February, 1985

## CLEANING PROCEDURES

### FOR PORTABLE RADIO EQUIPMENT WITH PLASTIC POLYCARBONATE HOUSINGS

Cleaning of Motorola portable radio equipment may be categorized as follows:

1. External surfaces
2. Internal components

External surfaces include front and back covers, frames, housings and battery covers. The only recommended agent for cleaning the external radio surfaces is a 0.5% solution of a mild dishwashing detergent in water.

The only factory recommended liquid for cleaning printed circuit boards and their components is ISOPROPYL alcohol (70% by volume).

#### CAUTION

The effect of certain chemicals and their vapors are known to have devastating results on certain plastics. Aerosol sprays and tuner cleaners may cause damage also. Even though the basic cleaning chemical may be compatible, the propellant or carrier may not be compatible and cause damage. Therefore, it is recommended that all chemicals and cleaning agents other than a mild dishwashing detergent be avoided.

#### 1. Cleaning External Surfaces

##### a. Polycarbonate Surfaces

The detergent-water solution should be applied sparingly with a stiff, non-metallic, short-bristled brush to work all loose dirt away from the radio. A soft, absorbent, lintless cloth or tissue should then be used to remove the solution and dry the radio. Make sure that no water remains entrapped near the connectors, cracks or crevices. Do not immerse the radio in the cleaning solution.

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If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

## 1. Cleaning External Surfaces (Cont'd)

### b. Silverized Surfaces

A non-metallic soft bristle brush should be used to apply the detergent-water solution to silverized surfaces, and a second non-metallic, soft bristle brush (free of detergent, or rinsed in clean water) should be used to remove the detergent-water solution.

Upon completion of the cleaning process, a soft, absorbent lintless cloth or tissue should be used (with a blotting action) to dry all surfaces. The blotting action will prevent damage to the silverized conductive coating.

## 2. Cleaning Internal Circuit Boards and Components

Isopropyl alcohol may be applied with a stiff, non-metallic, short-bristled brush to dislodge imbedded or caked materials located in hard-to-reach areas. Brushing strokes should direct the dislodged material out and away from the inside of the radio.

Alcohol is a high-wetting liquid and can carry contamination into unwanted places if an excessive quantity is used. Make sure that controls or tuneable components are not soaked with the liquid. Do not use high pressure air to hasten the drying process, since this could cause the liquid to puddle and collect in unwanted locations.

Upon completion of the cleaning process, use a soft, absorbent, lintless cloth to dry the area. Do not brush or apply any isopropyl alcohol to the frame, front cover or back cover.

### **NOTE**

Always use a fresh supply of alcohol, and a clean container, to prevent contamination by dissolved material (from previous usage).

# bulletin



**MOTOROLA**

**Communications and Electronics Inc.**

A Subsidiary of Motorola, Inc.  
1301 East Algonquin Rd., Schaumburg, Illinois 60196

## SERVICE AND REPAIR NOTES

### NUMERICAL AND CLASSIFIED INDEX

July, 1989

The index of Service and Repair Notes (SRN) contains the list of current bulletins on servicing and modification of radio equipment. It is divided into three parts as follows:

1. SRN NUMERICAL INDEX -- a listing of bulletins published during the last 10 years in numerical order.
2. SRN CLASSIFIED INDEX No. 1 -- a listing of bulletins issued before 1981 and classified by type of equipment.
3. SRN CLASSIFIED INDEX No. 2 -- a listing of bulletins issued after January 1, 1981 and classified by Accounting Product Codes (APC).

Because of a duplicity in application, the same SRN may be listed in more than one Classified Index Category.

#### NOTE

\*Indicates a new SRN since the last index.

These indexes supersede those published previously.



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886	2/80	Intermittent Cradle Hang-Up Switch in Series-80 Desk Top Controllers
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890	5/80	<i>PULSAR 100</i> Control Head Improvements and Functions
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892	4/80	Contacts for Technical Assistance and Information for Telephone Systems and Products
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895	8/80	Test Equipment Considerations for <i>Mitrek/Mocom 70</i> Radios
896	5/80	Elimination of Noise, Caused by DC Power Inverters, on <i>PULSAR</i> Fully Automatic Control Terminal
898	8/80	<i>Metrx</i> Code PlugSockets
899	7/80	Improved Locking of Swivel Mounting Bracket on <i>PULSAR</i> Mobile Control Heads
900	5/80	<i>PULSAR</i> Control Terminal Improvements for DAS Alarms and Multi-System 8-Channel BSI Operation
901	6/80	Improving Final Device in Low Band 60 Watt <i>Mitrek</i> Mobile Radios
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905	8/80	Low or Distorted Audio in <i>PULSAR</i> VHF Mobile Radiotelephones
906	10/80	Proper Testing and Troubleshooting of <i>Mitrek</i> Receiver Audio Output Circuit
907	11/80	Potential Power Out Failure Due to Inadequate Parts/Wire Clearance in 806-821 MHz <i>Micor</i> Radios
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1301 East Algonquin Rd., Schaumburg, Illinois 60196

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## SRN CLASSIFIED INDEX NO. 1 (CLASSIFIED BY TYPE OF PRODUCT)

July, 1989

### NOTE

This index includes SRN's published before January 1, 1981 and is classified by type of equipment. All SRN's originated after January 1, 1981 are classified by equipment Accounting Product Codes (APC) in Index No. 2.

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SRN CLASSIFIED INDEX NO. 2 (CLASSIFIED BY APC CODE)

July, 1989

**NOTE**

This index includes SRN's originated after January 1, 1981 and is classified by equipment Accounting Product Codes (APC). The APC number can be identified for equipment manufactured after January 1, 1978 by the first three digits of the serial number. SRN's published before January 1, 1981 are classified by type of equipment in Index No. 1.

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1019	4/84	<i>MX300</i> Sentry 1 (MDC) Emergency Signaling Option Being Activated by Static Charge
		APC-471, 571 <i>SABER II</i> VHF/UHF
1058*	5/88	<i>SABER</i> General Service Information Bulletin
		APC-476, 576 <i>HT90</i> VHF PORTABLE
982	11/82	Antenna Color Coding
1017	12/83	Reassembly/Reseal of <i>HT90/HT440</i> Radios
1047	10/87	<i>MT500</i> and <i>HT90/440</i> Fuse Replacement

## SRN CLASSIFIED INDEX NO. 2

July, 1989

<u>SRN NO.</u>	<u>DATE</u>	<u>SUBJECT</u>
		APC-477, 577 <i>HT90</i> UHF PORTABLE
967	6/82	<i>HT90/HT440</i> Antenna Coax Service Procedure
968	6/82	<i>HT90/HT440</i> Microphone Sensitivity
977	10/82	<i>HT90/HT440</i> Option Board Mounting Screws and Control Potentiometers (Squelch and Volume)
979	11/82	<i>HT90/HT440</i> Antenna BNC Service Procedure
982	11/82	Antenna Color Coding
1017	12/83	Reassembly/Reseal of <i>HT90/HT440</i> Radios
1047	10/87	<i>MT500</i> and <i>HT90/440</i> Fuse Replacement
		APC-479, 579 <i>MX300-S</i> PORTABLE
978A	7/83	UHF <i>MX300-S</i> Microphonic Improvements
1019	4/84	<i>MX300</i> Sentry 1 (MDC) Emergency Signaling Option Being Activated by Static Charge
1036	12/85	<i>MX</i> and <i>Expo</i> Radio Battery Contacts
1044A	2/87	Memory Module and Programming Change
		APC-481, 581 TRUNKED <i>SYNTOR X2</i> PRODUCTS
1024	8/84	Intermittent Potentiometers, <i>SYNTOR X</i> Products
		APC-483, 583 <i>SYNTOR X</i> RADIO
987	5/83	Removal of Primary Power from Mobile Radios During Hookup and Disconnect
		APC-484, 584 <i>MCX100</i> IMR
994A	4/84	Blank or Constant LED Display on the <i>MCX100</i> Mobile Radio
		APC-485, 585 <i>MX-T</i> AND PORTABLE TRUNKED ACCESSORIES
1036	12/85	<i>MX</i> and <i>Expo</i> Radio Battery Contacts
		APC-486, 586 900 MHZ <i>PURC</i> PAGING STATION
1043	12/86	Fuse Kit For <i>Micor</i> High Power Base Stations
1057	4/88	<i>PURC</i> Paging Base Station Modem Delay Module
		APC-492, 592 <i>SYNTOR X3</i> PRODUCTS
1025	8/84	Intermittent Potentiometers, <i>SYNTOR X</i> Products
		APC-493, 593 <i>SYNTOR X3 CONSOLETTTE</i> STATIONS
1024	8/84	Intermittent Potentiometers, <i>SYNTOR X</i> Products

## SRN CLASSIFIED INDEX NO. 2

July, 1989

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		APC-494, 594 <i>MOTRAR</i> CONTROL STATIONS AND <i>STARPOINT</i> 23 MICROWAVE
970	8/82	Potential Multiple Subfleet Cable Grounding in Trunking <i>Motrar</i> Radios
1044	4/87	<i>Starpoint</i> 23 AD added Fuse Protection and Power Converter Replacement
		APC-495, 595 FIXED END PACKAGES
972	8/82	Tantalum Capacitors Installed With Reverse Polarity
		APC-602, 702 DATA COMMUNICATIONS SYSTEM MICRO
1012	12/83	Possible Shock Hazard From Switching Power Supply VP20004A/0122012A19
		APC-605 VHF <i>EXPO</i> RADIO
1036	12/85	MX and <i>Expo</i> Radio Battery Contacts
1037	1/86	Universal <i>Expo</i> Speaker Bracket C401 Replacement
1051	11/87	<i>Expo</i> Nut Assembly
1056	2/88	<i>Expo</i> Volume Pot Replacement
		APC-614, 714 TONE ONLY BPR SERIES
1033	9/85	New Low Conversion and Demodulator Module
		APC-620, 720 <i>DVP</i> <i>MX300S</i>
1018	2/84	<i>MX300S</i> <i>DVP</i> and DES Module Incompatibilities
1019	2/84	<i>MX300</i> Sentry 1 (MDC) Emergency Signaling Option Being Activated by Static Charge
1036	12/85	MX and <i>Expo</i> Radio Battery Contacts
1044A	2/87	Memory Module and Programming Change
1062*	10/88	Submersibility Test Procedures For the <i>MX300-R</i> Series Portable
		APC-626, 726 <i>STX</i> Radio
1034	10/85	<i>STX</i> Transmit Audio Sensitivity Problem
1038	8/86	<i>STX</i> Portable Dropout of Phone Interconnect Back to Dispatch Mode
1040	10/86	<i>STX</i> Synthesizer Unlock Problem
1046	1/88	Premature Battery Alert Problem
1054	1/88	<i>STX</i> Audio Howl Issue
		APC-649 <i>HT600</i> UHF
649	11/87	<i>HT600</i> Cloning
1059*	9/88	<i>HT600</i> Radio and Accessories Common Problems

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1049*	11/87	APC-651 <i>HT600</i> VHF
1059*	9/88	<i>HT600</i> Cloning
		<i>HT600</i> Radio and Accessories Common Problems
1059*	9/88	APC-653 <i>HT600</i> ACCESSORIES
		<i>HT600</i> Radio and Accessories Common Problems
1058*	5/88	APC-654 <i>SABER I</i> VHF
		<i>SABER</i> General Service Information Bulletin
1058*	5/88	APC-655 <i>SABER I</i> UHF
		<i>SABER</i> General Service Information Bulletin
1058*	5/88	APC-656 <i>SABER III</i> VHF
		<i>SABER</i> General Service Information Bulletin
1058*	5/88	APC-657 <i>SABER III</i> UHF
		<i>SABER</i> General Service Information Bulletin
1050	11/87	APC-719, 705 ON SITE SYSTEMS
1051	11/87	<i>Porta-Pak</i> Control Box NTN4764A
1061*	8/88	<i>Expo</i> Nut Assembly
1063*	8/88	Menu Speaker Mounting Instructions
		<i>Porta-Pak</i> Level Setting Procedure
1066*	1/89	APC-749 <i>MT1000</i> UHF
		<i>MT1000</i> Upgrade Kit REX4062A
1066*	1/89	APC-751 <i>MT1000</i> VHF
		<i>MT1000</i> Upgrade Kit REX4062A
946	1/82	APC -- N/A GENERAL
947	2/82	Vinyl Cabinet Surface Stickiness
949	2/82	FCC Issuance of General Radiotelephone Operator License
		Oil Filled Transformers, Capacitors and Electromagnetic
		Containing PCB's (Polychlorinated Biphenyls)
1001	8/83	Precaution in Servicing Trunked Repeater, Repeater, and Base
		Stations
1002	8/83	Secure Communications Equipment Deviation Adjustment and
		Measurement for DES and DVP Radios
1004	9/83	Caution Requirement for Test Equipment Products.
1021	7/84	Use of a Less Active Rosin Core Wire Solder for Repair of
		Leadless Components
1027	3/85	Secure Communications Equipment Transmitter Deviation
		Measurement and Adjustment



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July, 1989

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1032	2/85	Cleaning Procedures For Portable Radio Equipment With Plastic Polycarbonate Housings
1052	2/88	Static Control Equipment For Servicing "ESD" Sensitive Products

# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## ROUTING

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 SRN-669B\*\*  
 September, 1979  
 APC-203

## FIELD REPAIR AND TUNE-UP PROCEDURE FOR THE UHF "MICOR" ANTENNA SWITCHING NETWORK

Models Affected: All T34RTA, T44RTA, T54RTA, and T74RTA Series UHF "Micor" Radios

Antenna Switching Networks: Models TFE6221A, TFE6223A, TFE6224A, TFE6225A, and TFE6333A

The following procedure is used when replacing the reed switch assembly (Part No. 1V80747B76) and retuning the Antenna Switching Network. Retuning is necessary because of the possible disturbance of circuit parameters caused by the modification. Many antenna switching network defects are caused by defective reed switches.

### NOTE

The statement in the UHF MICOR Mobile instruction manual that "The Antenna Switching Network is not field repairable is no longer correct. Only the round black Ferrite circulator assembly within the Network is not repairable, and if this circulator becomes defective (as indicated by burnt ports) within 1 year of shipment the entire TLE Network will be replaced by Motorola C & E Parts Office when submitted with the Motorola form Stic 5.

A faulty reed switch could cause a degradation in receiver sensitivity, or a reduction in transmitter-receiver isolation. Perform the antenna switching network performance tests described in the TROUBLESHOOTING & REPAIR section of the UHF "Micor" instruction manual 68P81015E70. If the reed switch assembly is suspected, replace as follows:

1. Remove antenna switching network as described in the TROUBLESHOOTING & REPAIR section of the UHF "Micor" manual.
2. Remove the Antenna Switching Network cover by removing six Phillips screws.
3. Remove reed switch assembly as follows:

**\*\* Supersedes and invalidates SRN-669A issued October, 1977.**

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

(OVER)

- 3.1 Remove the two Phillips mounting screws.
- 3.2 Unsolder the three wires going to the feed-through capacitor and the 50-ohm resistor, taking care not to damage the 50-ohm resistor.

NOTE

Refer to the end of this SRN for proper procedure to disconnect 50-ohm resistor wire.

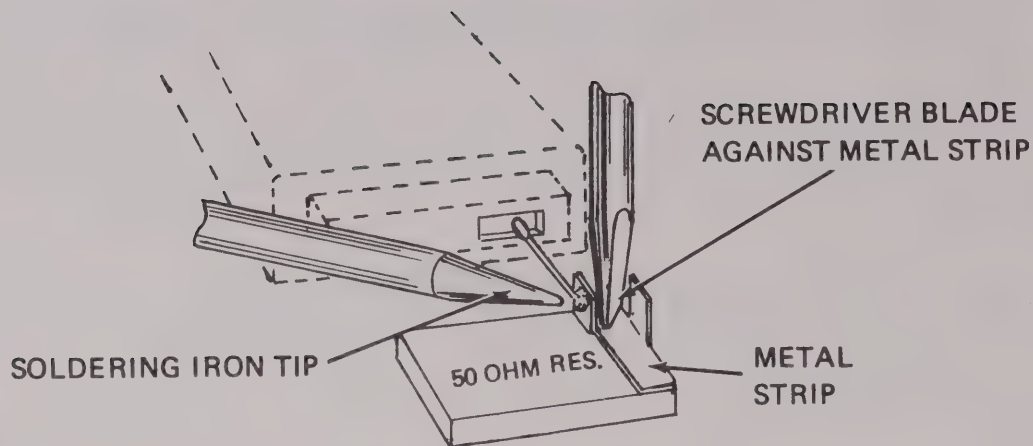
- 3.3 Unsolder the solid coax shield and center conductor going to the circulator.
- 3.4 Clip the phono connector off the white coax cable.
- 3.5 Remove reed switch assembly.
4. Install the new reed switch assembly 1V80747B76 as follows:
  - 4.1 Insert the white coax cable through the Antenna Switching Network housing and set the new reed switch network in place.
  - 4.2 Insert and tighten the two Phillips mounting screws.
  - 4.3 Solder the connecting wires to the feed-through capacitor and the 50-ohm load. Also solder the solid coax cable to the circulator and ground surface.
  - 4.4 Resolder a new 28C84282D01 Male Phono Connector to the white coax cable. The old phono connector may be cleaned and used for this purpose.
5. Retune the Antenna Switching Network as follows:
  - 5.1 Connect an RF signal generator to the coax receiver connector through a 6 dB pad.
  - 5.2 Connect a 50-ohm load to the transmitter connector. A miniature BNC female connector is needed. It is recommended to use cable #6 shown in the PK700A Cable Kit detail in the TEST EQUIPMENT paragraph of the TROUBLESHOOTING & REPAIR section of the UHF "Micor" manual.



- 5.3 Connect a 50-ohm RF voltmeter to the antenna connector. The voltmeter should be capable of reading at least 40 dB below the generator level.
- 5.4 Set the RF generator frequency, halfway between the receive and transmit frequencies, if different. Set generator output to maximum.
- 5.5 Refer to the Power Control Board and Antenna Network Schematic Diagram in your UHF "Micor" Instruction Manual. Adjust variable capacitor C1009 on the transmitter leg of the circulator for minimum indication on the RF voltmeter.
- 5.6 Move signal generator to the transmitter connector, the 50-ohm load to the antenna and the RF voltmeter to the receiver connector. Adjust variable capacitor C1011 on the antenna leg of the circulator for minimum indication on the RF voltmeter.
- 5.7 Move the signal generator to the antenna connector, the 50-ohm load to the receiver connector and the RF voltmeter to the transmitter connector. Adjust variable capacitor C1010A on the receiver leg of the circulator for minimum indication on the RF voltmeter.
6. Repeat Steps 5.1 through 5.7 until no further improvement is obtained.
7. Check the Antenna Switching Network for satisfactory operation as outlined in the TROUBLESHOOTING & REPAIR section of the manual. Failure of the 50-ohm resistor of the magnetic circulator are not considered repairable problems, and replacing the entire Antenna Switching Network is recommended.
8. Reinstall the Antenna Switching Network in radio and check receiver sensitivity and transmitter power.
9. The Reed Switching Assembly (part no. 1V80747B76) is available from the Communications Group Parts Department as a replacement at no cost when ordered on the STIC-5 (Request for IN-Warranty Replacement Form). Reference the Model and serial number of your radio set when ordering the part.

In order to avoid damage to the resistor, a small (dial) screwdriver is recommended to be used as a "Heat Sink" while unsoldering lead from the reed relay. The end of the screwdriver blade should be pushed against the metal strip on the end of the resistor, between the two soldering tabs, per drawing.





GAEPS-24814-A

As the lead from the reed assembly is not wrapped around the resistor lug, a moderate side pressure toward opposite end of the resistor (e.g. with a small scribe) should be applied to the lead while unsoldering the connection. The pressure will allow the lead to pull away when the solder flows.

This will avoid melting the solder under the metal strip preventing resistor damage. It is also recommended that a "blunt" soldering tip be avoided, as more heat will be transferred to the metal strip with such a tip. Also, it is advantageous to use an iron wattage just adequate for soldering. It is therefore recommended that a sharp tip soldering iron be used approximately 35 to 50 watts.

#### Parts Required

Motorola Part No.	Description	*User Price
17-84857E01	RESISTOR, fixed; WW, 50 ohm $\pm$ 5%; 50 W	\$ 5.98 EA.
11-10019B12	EPOXY	\$14.39 EA.
ST-473	SOLDERING IRON, less tip	\$13.33 EA.
ST-475	TIP, soldering 3/16" Dia.; 1/32 x 1/32 x 2-1/4" long	\$ 3.42 EA.
OR ST-477	TIP, soldering 3/16" Dia.; 3/32 x 1/32 x 2-1/4" long	\$ 3.42 EA.

Parts are available from the Communications Group Parts Department.

# bulletin

**MOTOROLA**

COMMUNICATIONS AND ELECTRONICS, INC.

A SUBSIDIARY OF MOTOROLA, INC.

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## ROUTING

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SRN-840

May, 1979

APC 227

Deadline Date: 12/31/79

**"Pulsar" Fully Automatic Control Terminal**

Models Affected: T1821A thru T1826A  
T1917A

**I. INPUT/OUTPUT TRUNK BOARD MODIFICATIONS TO PREVENT OVER-DISSIPATION**

Factory modifications have been incorporated into the TRN6469A "Pulsar" Terminal Input/Output Trunk Board to prevent potential power overdissipation, which can result in damage to the printed circuit board.

This condition can occur if the total dc loop resistance as seen by the TRN6469A's inward trunk (i. e., looking out from pins MM and TT on the TRN6469A card) back towards the central office equipment, is less than 120 ohms. Be sure to consider the lowest possible resistance that would be switched into the circuit by the central office.

If this situation exists, the modifications detailed in this bulletin are strongly recommended. The modification consists of adding a 100-ohm, 1-watt resistor in each side of the inward trunk circuit as shown in Figures 1 and 4A. These resistors are identified as R300 and R301.

Control terminals that shipped before April 21, 1978 will most likely require all of the modifications described in this bulletin. Those shipped between April 21, 1978, and November 10, 1978, will already have resistors R300 and R301 installed and require only one foil cut and the addition of one jumper. Those terminals shipped after November 10, 1978 will probably not require any changes. In all cases, a visual inspection of the printed circuit board should be made to determine which modifications, if any, are required.

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

## NOTE

Only boards identified with the part number 84E84307K01 need be checked. Later boards, which bear a different part number, are not affected.

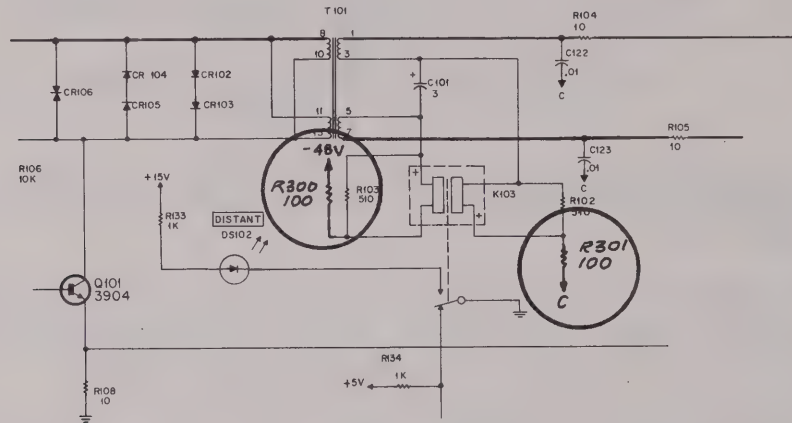


Figure 1. Partial Schematic of I/O Trunk Board TRN6469A Showing Location of Resistors R300 and R301

DETAILS OF CHANGE:

## 1. FOIL CUTS

Using Figure 2 as a guide, make the following foil cuts on the copper side (i. e. non-component side) of the printed circuit board:

- (a) Terminals shipped before April 21, 1978 - cut #'s 1, 2 and 3.
- (b) Terminals shipped between April 21, 1978, and November 10, 1978 - cut #1 only.
- (c) Terminals shipped after November 10, 1978 - no cuts required.



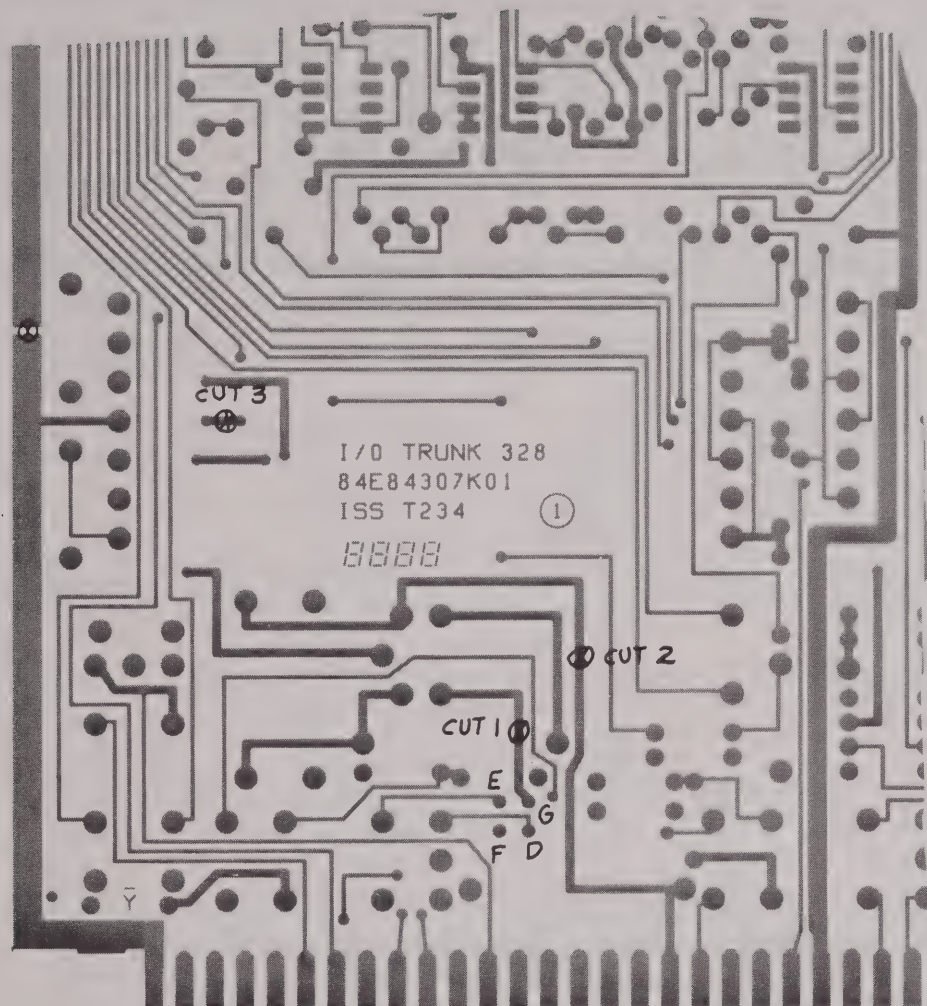


Figure 2. Solder Side of I/O Trunk Board TRN6469A  
Showing Foil Cut Location (See Paragraph 1 for specific directions)

## 2. JUMPER REMOVAL

For only those terminals that shipped before April 21, 1978, remove jumper "X" as shown in Figure 3.

## 3. JUMPER ADDITIONS

For all terminals shipped before November 10, 1978, add an insulated jumper wire (jumper "W") from programming Pin G to C122 as shown in Figure 3. The procedure for doing this is as follows:



- (a) Unwrap any wirewrap jumper which may be on Pin G.
- (b) Carefully solder jumper "W" on the component side of the board between the base of Pin G and C122 (i.e. communications ground "C"). Route the jumper as shown in Figure 3.
- (c) Reconnect the wirewrap jumper to Pin G that was removed in step (a).

For only those terminals that shipped before April 21, 1978, also add jumper "Y", as shown in Figure 3. Use insulated wire for the jumper.

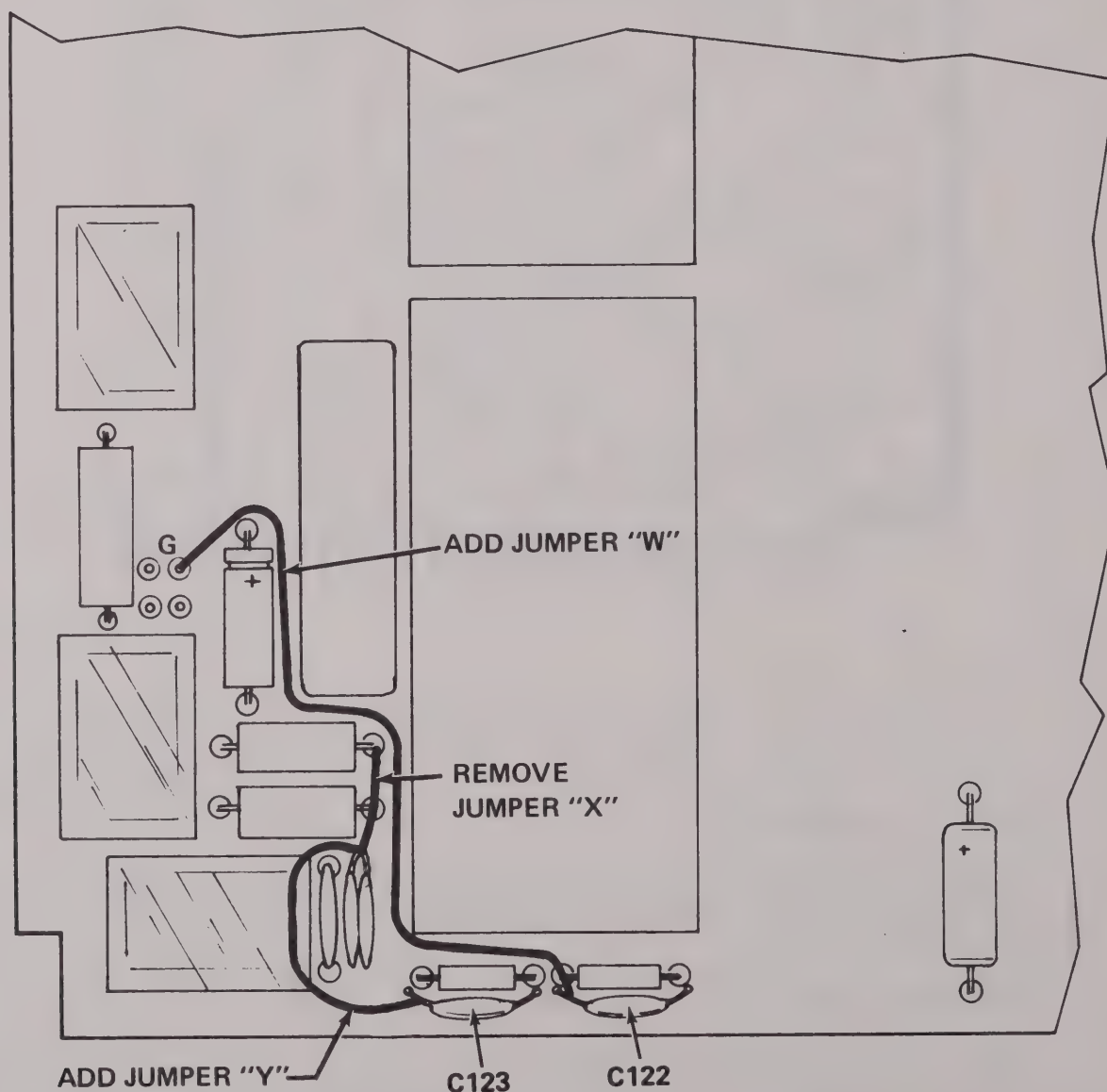


Figure 3. Component Side of I/O Trunk Board TRN6469A  
Showing Jumper Location (See Paragraphs 2 and 3 for specific directions)

#### 4. RESISTOR ADDITIONS

For only those terminals shipping before April 21, 1978, construct two resistor assemblies (R300 and R301) and add them to the board.

- (a) Construct the resistor assemblies as shown in Figure 4. Use insulated wire, and solder all connections. Minimize exposed wire.

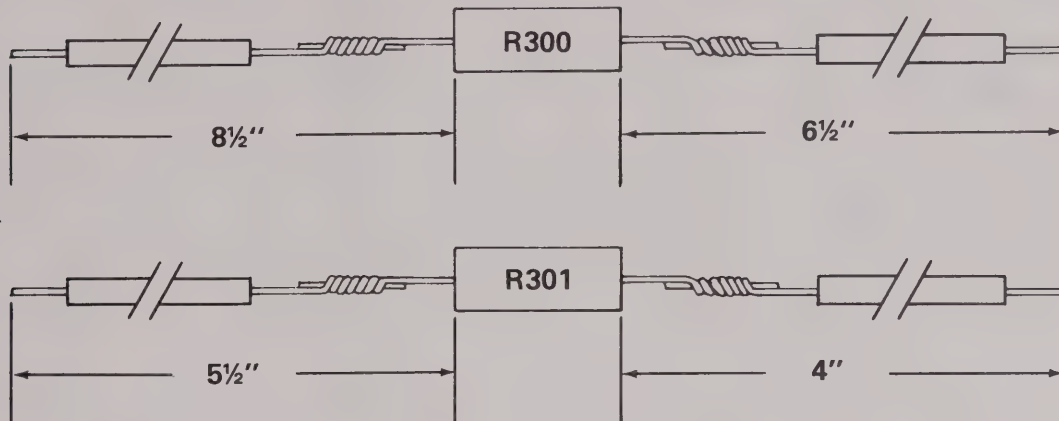


Figure 4. Construction Details for Resistors R300 and R301

- (b) Connect the resistors as shown in Figure 4A. Note that all connections are made on the component side of the board. Route the resistor wires as shown, and epoxy the resistors to the board in the area shown, being careful not to make contact with other components. To make connections to resistors R102 and R103, it will be necessary to first unsolder these resistors, make the new connections, and then solder them back into the board.

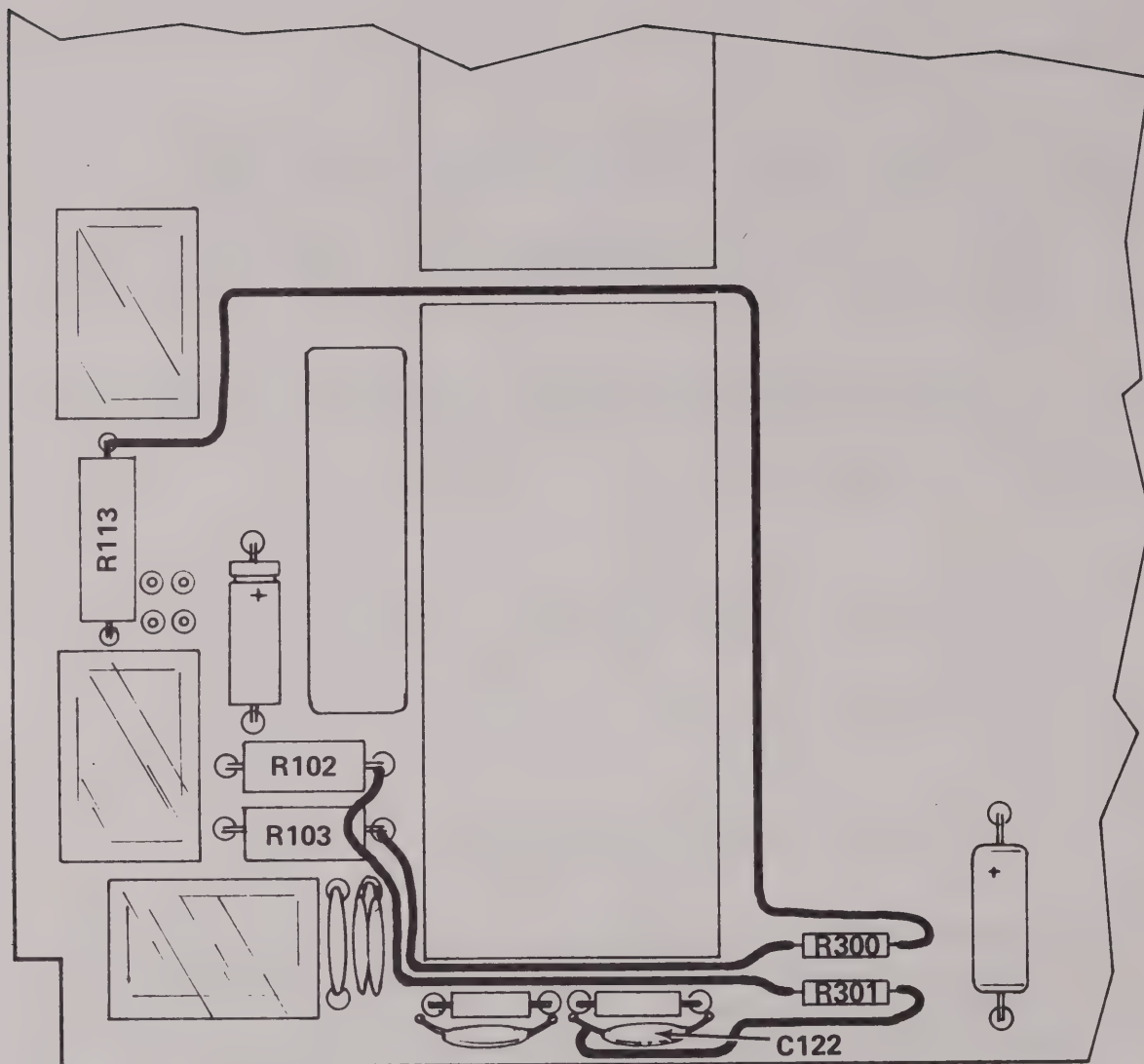


Figure 4A. Component Side of I/O Trunk Board TRN6469A  
Showing Location of Resistors R300 and R301

## 5. INSPECTION

The many steps in the foregoing procedure warrants a careful inspection of the circuitry by the serviceman, including a check for inadvertent short circuits, as well as a comparison of the modifications performed to the schematic in Figure 1.

## 6. PART ORDERING

The two resistors required for this modification (R300 and R301) may be ordered from your local area parts depot at no charge until December 31, 1979.

When ordering the resistors, reference this SRN bulletin and include the model number, serial number and factory order (F.O.) number of the "Pulsar" terminal with each request.

#### PARTS REQUIRED

<u>QTY</u>	<u>MOTOROLA PART NO.</u>	<u>DESCRIPTION</u>	<u>USER PRICE</u>
2 per board	6-126A25	RESISTOR, fixed: 100 $\pm$ 5%; 1 W	\$1.91 PK/10

## II. IMPROVED REVERTIVE CALL OPERATION

A design improvement has been incorporated into the "Pulsar" fully automatic terminal to reduce the potential for certain revertive calls (i.e., single-channel mobile to mobile calls) being aborted. The condition is likely to be most prevalent during peak traffic periods on heavily loaded systems although the probability of occurrence to any particular mobile will generally be low.

Therefore, for those systems where improvement may be desirable, details of the necessary modifications are attached. Terminals shipped after March 1, 1978, are unlikely to require any changes.

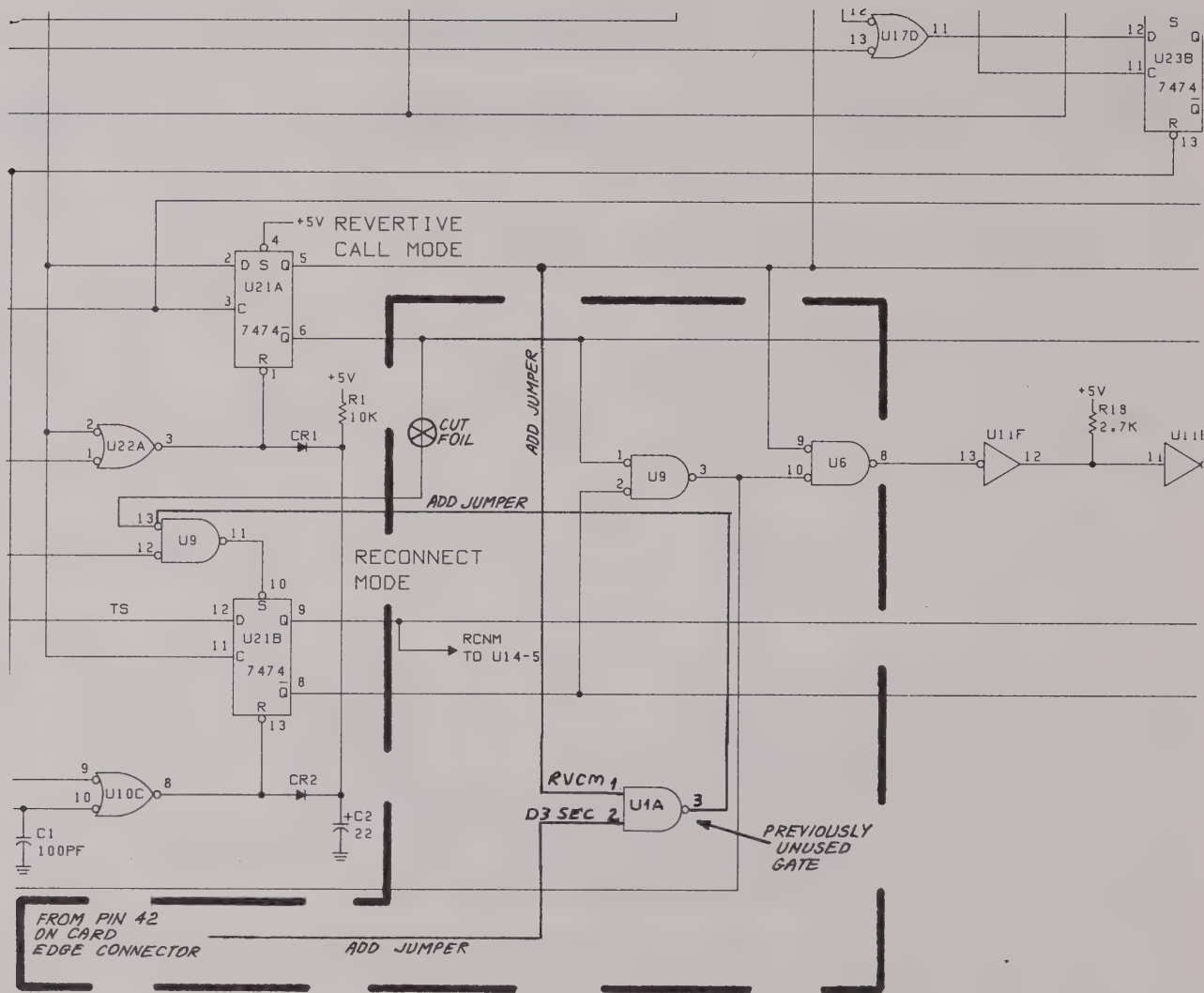
The condition can be described as follows. When a "Pulsar" terminal is programmed for revertive call operation, and when a revertive call is initiated, the terminal reassigns idle tone to the rf channel handling the call for three seconds (to lock all scanning mobiles on that channel). During this three-second period, however, if another mobile attempts to initiate a call, the revertive call in progress will not be completed. Instead, the terminal immediately sends out a ringing signal without having outputted the number of the mobile being called. If the subscriber who has initiated the revertive call does not realize this, he might remain off-hook in anticipation of completing his call. This could tie up the channel for the duration of the ringing period and cause the subscriber to be billed for air time.

The modifications should be made to each TRN6478AA or AB Crosspoint and Manual Control Board. (Boards marked with a "-1" suffix or higher already have the changes). An explanation is as follows:

1. On unmodified boards, ringing is activated during revertive calls by a burst of Guard Tone from any mobile. This occurs when the "RECONNECT MODE" flip-flop, U21B, gets set by U9.

2. With the modification, U21B will be inhibited from setting until D3SEC switches high. See Figures 5 and 6 for the modification details.





⊗ = PLATING CUT

AFFECTED AREA WITHIN HEAVY DASHED LINES

EEPS-19241-B  
(SHT 2 OF 3)

Figure 5. Partial Schematic of Crosspoint and Manual Control Board TRN6478AA/AB Showing Modification

COMPONENT SIDE	SOLDER SIDE
1	A
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L
11	M
12	N
13	P
14	R
15	S
16	T
17	U
18	V
19	W
20	X
21	Y
22	Z
23	AA
24	BB
25	CC
26	DD
27	EE
28	FF
29	HH
30	JJ
31	KK
32	MM
33	NN
34	PP
35	QQ
36	RR
37	SS
38	TT
39	UU
40	VV
41	WW
42	XX
43	YY

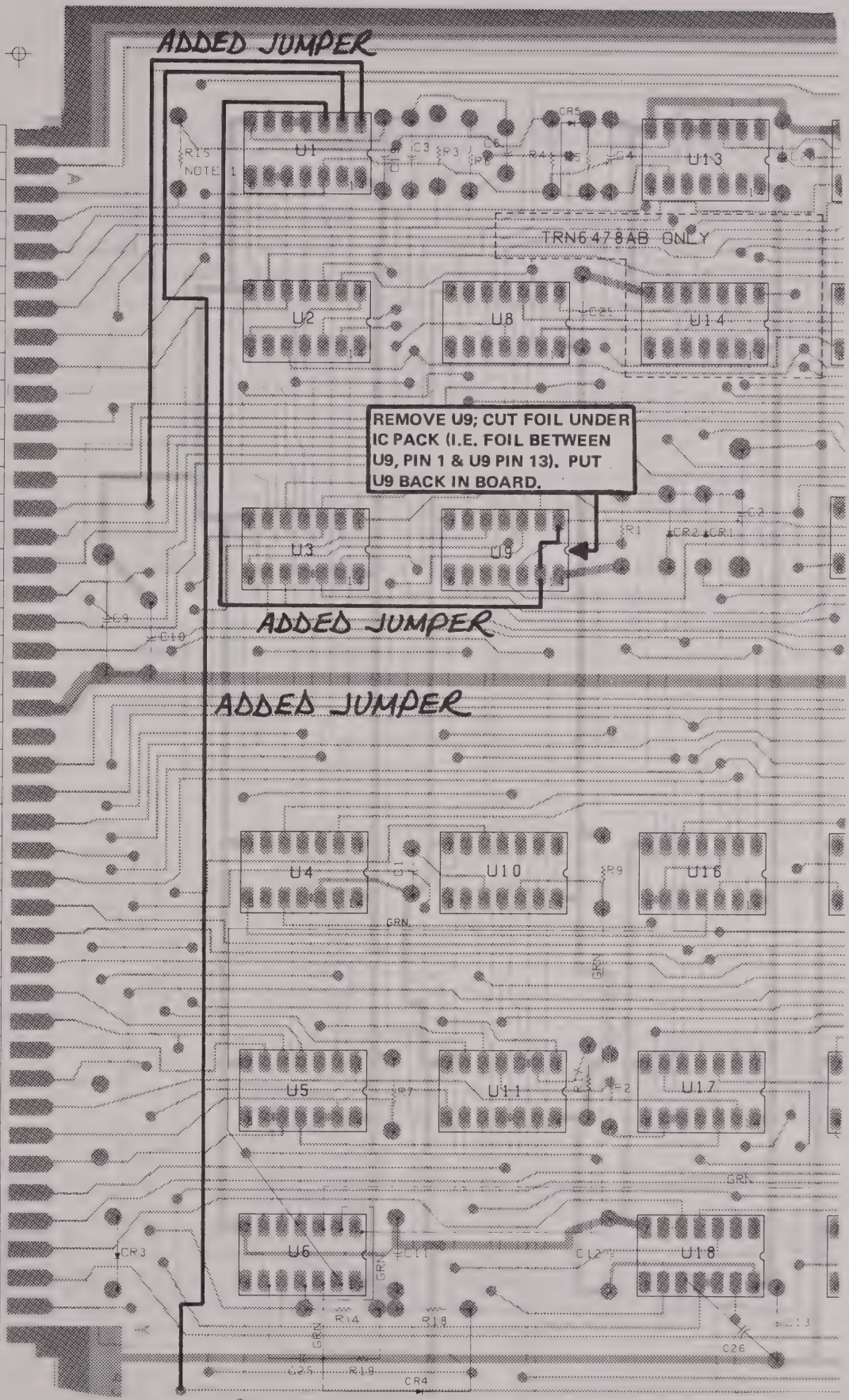


Figure 6. Circuit Board Detail of Crosspoint and Manual Control Board TRN6478AA/AB Showing Modification Details



### III. MATRIX BOARD IMPROVEMENT

The "Pulsar" Terminal Matrix Board, TRN6457AA and TRN6457AB has been improved to eliminate the requirement to use semiconductors with special characteristics. All terminals which have been shipped since December 1, 1976 have the new Matrix Boards: TRN6457AC (replaces "AA"), TRN6457AD (replaces "AB") and TRN6457AE (all 8-channel models).

For those earlier terminals with "AA" and "AB" Matrix Boards, the following information is important when ordering a new or spare Matrix Board, or when ordering semiconductors to repair Matrix Boards.

The new design of the Matrix Board was accompanied by a modification to the Register Control Board, changing that card from a TRN6470A to a TRN6470B\*. The new Register Control Board, TRN6470B, will operate with any Matrix Board. However, the new Matrix Boards (TRN6457AC, "AD" and "AE") will function properly only with the new Register Control Board TRN6470B. Therefore, when ordering a replacement Matrix Board for terminals which contain old TRN6457AA or "AB" Matrix Boards, it will be necessary to order new TRN6470B Register Control Boards for all equipped registers with the new TRN6457AC or TRN6457AD Matrix Boards being purchased to maintain compatibility.

Also, when ordering replacement semiconductors for "AA" and "AB" Matrix Boards, the following improved parts must be ordered instead of the parts listed in the "Pulsar" terminal instruction manual. (Part numbers in the manual are correct for "AC", "AD" and "AE" Matrix Boards).

#### PARTS REQUIRED

CIRCUIT REFERENCE	DESCRIPTION	PART NUMBER TO BE ORDERED
U1 thru U17 & U33 thru U49	1 x 8 Crosspoint Diode Array	51-82280L03
Q1 thru Q16	Transistor, type 2N2907	48-84412L07
Q21 thru Q36	Transistor, type 2N2222	48-84080F07

\*NOTE: Some terminals use TRN6470C. All statements made here concerning TRN6470B also pertain to TRN6470C.

#### IV. ELIMINATION OF PREMATURE DIAL TONE

The introduction of the redesigned TRN6477BA and TRN6477BB Tone Control Boards into the "Pulsar" Terminal resulted in the requirement that the first half-second following the seizure of an outward trunk by the terminal on mobile-to-land calls be free of mobile signaling tones (i. e. mobile dialing). To preclude the possibility of a subscriber starting dialing during this period, which could result in the call being aborted, modifications were recently incorporated on the TRN6470B and TRN6470C Register Control Boards to delay the application of dial tone to the mobile channel for one second.

On terminals that shipped between March 30, 1979, and April 24, 1979, the aforementioned delay was achieved by the addition of a resistor-capacitor network (R20, R100, C100) to the Register Control Board as shown in Figure 7. These boards are marked "TRN6470B-1" and "TRN6470C-1". In certain infrequent situations this network can cause complications in processing calls, therefore it should be disabled before making the modification described below. To disable the network, disconnect the negative side of capacitor C100 from the point where it connects to the board.

Terminals that shipped after April 24, 1979, are already equipped with the modifications described below. Factory modified boards can be identified with the marking "TRN6470B-2" and "TRN6470C-2"

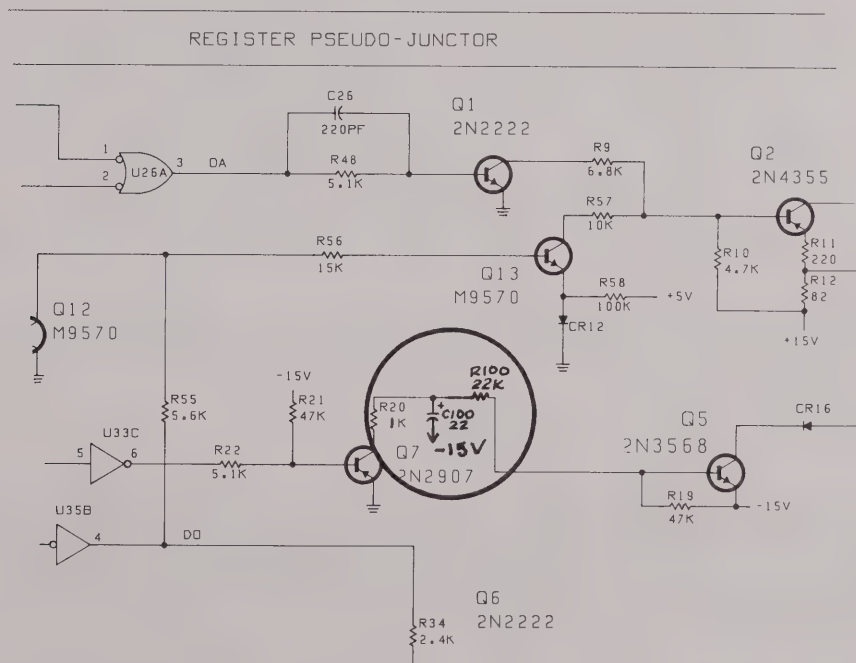


Figure 7. Partial Schematic of TRN6470B-1 and TRN6470C-1 Register Control Boards



## DETAILS OF CHANGE

### 1. FOIL CUT

On TRN6470B, TRN6470B-1, TRN6470C and TRN6470C-1 Register Control Boards, make the single foil cut shown in Figures 8 and 9, on the solder side of the board.

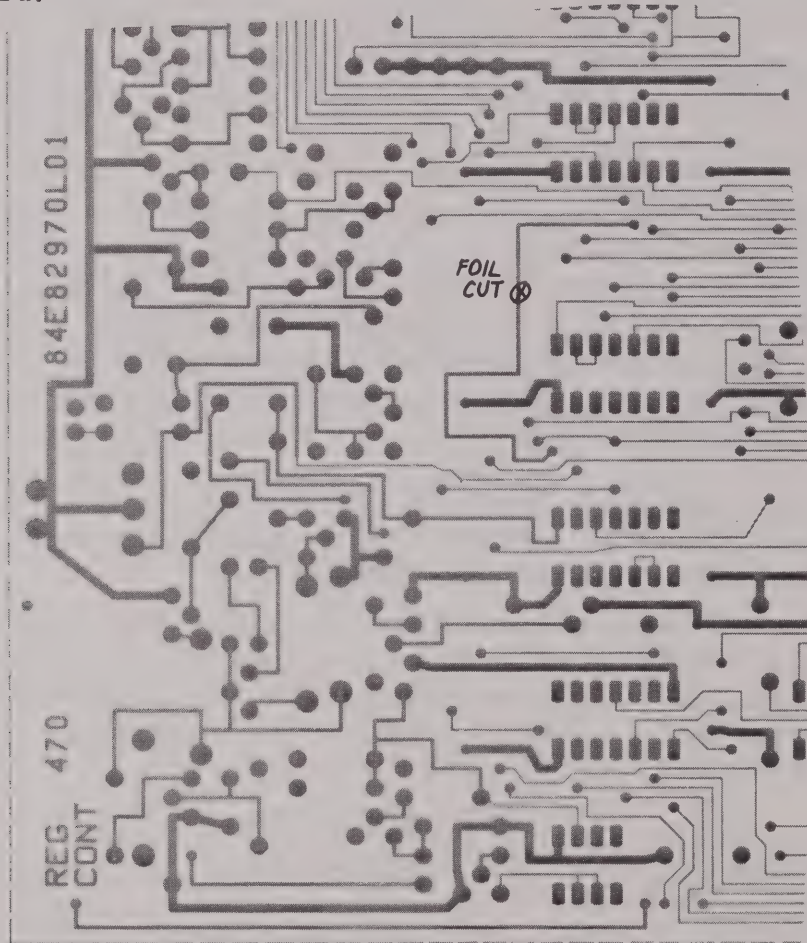


Figure 8. Solder Side of TRN6470B/B-1 and TRN6470C/C-1 Register Control Boards Showing Foil Cut Location

### 2. ADDITION OF INTEGRATED CIRCUIT

An additional 51-84371K24, type 7474 "D" flip-flop must be added to the board (see Figure 9) to accomplish the modification. This IC will be physically attached to the top of IC27, as described below and as shown in Figure 10, and will be identified as U38.

- a) Prepare the extra IC by clipping off pins 6, 8, 9, 10, 11, 12 and 13 close to the body of the IC, being careful not to damage the package.
- b) Carefully bend pins 1, 2, 3, 4, and 5 up and straight out, parallel to the bottom of the IC.
- c) Place IC U38 on top of U27 and solder pin 7 of U38 to pin 7 of U27, and pin 14 of U38 to pin 14 of U27.
- d) Solder together pins 1 and 2 of the top IC, U38.
- e) Solder insulated jumper wires to pins 1/2, 3, 4 and 5 of the top IC, U38, and solder the opposite ends to the component side of the printed circuit board, as shown in Figure 10.

### 3. PART ORDERING

Integrated circuit U38 may be ordered from your local area parts depot at no charge until December 31, 1979. When ordering the IC, reference this SRN bulletin and include the model number, serial number, and factory order (F.O.) number of the "Pulsar" Terminal with each request.

#### PARTS REQUIRED

<u>QTY</u>	<u>MOTOROLA PART NO.</u>	<u>DESCRIPTION</u>
1 per Register Control Board	51-84371K24	IC, type 7474

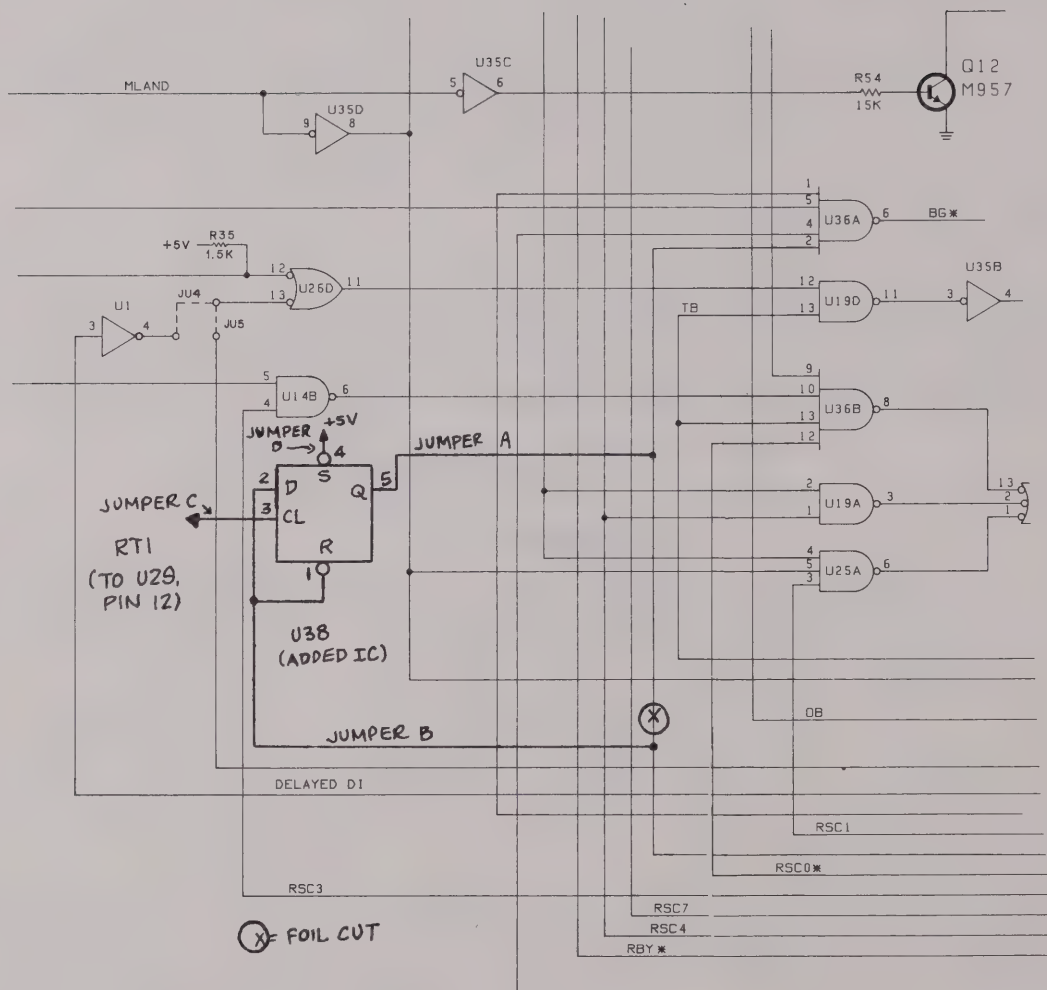


Figure 9. Partial Schematic of TRN6470B/B-1 and TRN6470C/C-1 Register Control Boards Showing Modification Details



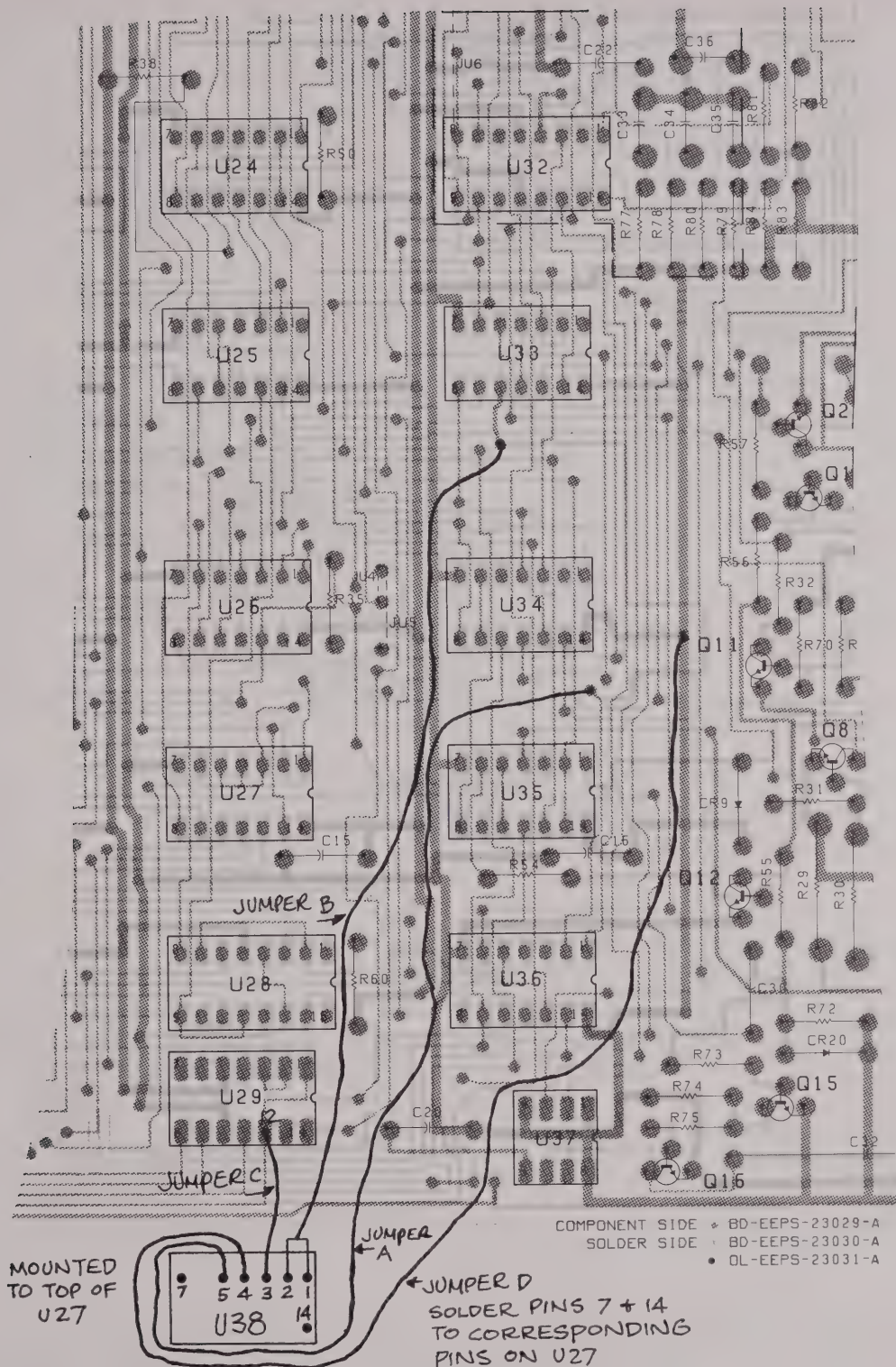


Figure 10. Component Side of TRN6470B/B-1 and TRN6470C/C-1 Register Control Board Showing Addition of U38





# bulletin

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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-844

January, 1979

APC 213

Deadline Date: June 30, 1979

Simultaneous Signalling (2850 Hz) and Voice on Same Channel Used in Secode "SMART" Systems.

Models Affected	Description	Filter Kits Required
T1880A or B with T195 Option	MARK VII VHF	TLN2000A
T1879ASP03	Pulsar II VHF	TLN2000A
T1839ASP06	Pulsar II UHF	TLN2130A

VHF and UHF Pulsar or MARK VII RCC Car Telephone Radios using Motorola Control Heads with T195, ANI Option may experience a system problem when used with certain Secode "SMART" System terminals. This problem is usually evident upon a call being missed.

If a call comes in on a calling channel while conversation is taking place, signalling may occur simultaneously with voice on that channel. The sensitivity of the radio Supervisory Unit is such that the radio will not always decode an incoming (2805 Hz) call over voice with a system signalling deviation 1.5 kHz, thus resulting in a missed call.

To resolve this system problem, a narrow band 2805 Hz filter has been designed to filter out voice and decode the incoming call with voice on the channel.

The 2805 Hz Filter Board Accessory Kit numbers are TLN2000A for VHF RCC radios, and TLN2130A for UHF RCC radios.

All new VHF Pulsar, T195 option orders shipped after September 15, 1978, will include the TLN2000A Filter Board Accessory Kit.

All new UHF Pulsar orders with T195 option shipped after November 15, 1978 will include the TLN2130A Filter Board Accessory Kit.

SRN-844

1-3-79

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

The TLN2000A and TLN2130A Filter Kits will be available after December 1, 1978 at no charge until June 30, 1979 from your area Motorola C & E Parts Office, Schaumburg, Illinois 60196. Reference must be made to this bulletin including model and serial numbers of radio with each order.

The no charge kits only apply to those radios that have been shipped with the T195 ANI or were SP'd for the same capability to operate with Secode "SMART" Systems. Any radios or radio packages that were ordered, less a Motorola Control Head and/or a T195 option, do not qualify for this no charge kit. Also, any radio now in the Field, that will in the future be converted to Secode ANI with a Motorola Control Head, does not qualify for a free kit.

For all the Motorola package sets now in the field with a Secode head or any competitive control head with its own RCC logic board, these filter kits are not necessary and no change to the radio unit is required.

KIT REQUIRED

Motorola

Model No.

Description

TLN2000A

VHF Filter Board Accessory Kit

TLN2130A

UHF Filter Board Accessory Kit



# bulletin

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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

ROUTING

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SRN-848

January, 1979

APC-213

Deadline Date: Dec., 1979

Pulsar II Mobile Telephone Control Head RF Interference, Audio Feedback and Auxiliary Alarm Function.

Motorola Models Affected	Control Heads Affected	Pulsar II Usage
T1877A	TCN1233A	VHF Telco
T1878A	TCN1241A	VHF Telco
T1879A	TCN1241A	VHF RCC
T1837A	TCN1233A	UHF Telco
T1837A/T144AA	TCN1235A	UHF Telco
T1838A	TCN1241A	UHF Telco
T1838A/T144AB	TCN1243A	UHF Telco
T1839	TCN1241A	UHF RCC

### I. RF Interference

#### 1. "Pulsar II" Desense

On some Pulsar II installations, an unusual desense phenomenon has been noted. RF energy radiated from the antenna into the Cable Kit mixes with data signals in the Junction Box to produce a broad band spectrum of energy centered about the transmitter frequency. This energy re-radiates from the Cable Kit back to the antenna, where that portion of the spectrum that falls on the radios receive frequency, mixes with the desired incoming signal causing desense. Since this type of desense depends on the radiation path between the Junction Box Cable Kit and the antenna, placement of the antenna is critical. This unique desense characteristic can be used to distinguish it from other more common causes of desense.

If a vehicle is suspected of having this problem, verification can be made by using an auxiliary antenna (coaxial or magnetic mount). This auxiliary antenna should be connected to the radio, and the transmitter should be keyed up on a channel with a weak signal. If the desense is of this type, minimum desense will occur when the antenna is moved to a location, such as  
(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.



the vehicle roof, where the sheet metal of the vehicle body shields the Cable Kit/Junction Box from the antenna.

Upon verification of this desense problem, the following modifications should be made to the Junction Box:

Add an LC filter to the A+ line of the Cable Adapter, as shown in Figure 1.

Add (2) bypass capacitors, one across diode CR2 and one from the anode of CR2 to ground on the Power Supply board as shown in Figure 2.

Identity of parts required is shown in both Figure 1 and Figure 2.

This modification has been incorporated in all factory units built after March 1, 1978. Junction Boxes with this modification included are stamped TLN1863A-2 (4 ft. flat cable) and TLN1863A-3 (7 ft. flat cable).

## 2. "Pulsar II" Transmitter Noise

Transmitter energy from the antenna radiating into the transmitter audio circuits of the Handset and Junction Box can induce a low level "buzz" in the transmitted audio. In most cases, this "buzz" will be at an inaudible level, however, if the mobile is operating into a Base Station with an Audio Compression Amplifier (VOGAD Componder) set for maximum gain, the "buzz" may be amplified to a high enough level to become annoying. Since the "buzz" level heard is dependent on the Base Station audio gain, this problem can vary from channel to channel. The mobile user will hear this "buzz" as a sidetone in the system.

Verification of this problem can be accomplished by pulling out the transmitter audio pin from the Cable Kit connector (Pin 22 of the black plug). The "buzz" will go away when the pin is pulled if this is actually the source of the noise.

Upon verification of the noise problem the following modification should be made to eliminate the source of noise:

Add a bypass capacitor from the output of the MIC Pre-amp to Audio ground; Pin 6 on Handset Audio Logic Board U6 to Pin 4 of U6 board as shown in Figure 3.

Add bypass capacitors across the B-E junctions of the Audio Mute and Audio Buffer transistors Q5 and Q6 on the Junction Box Cable Adapter Board as shown in Figure 4.

All units fabricated after August 1, 1978 incorporate this modification. Junction Boxes that include this change are stamped TLN1863A-4.

### 3. "Pulsar II" Transmitter Noise, VHF Only

The same symptom as described in Section 2 can be caused by RF energy radiating from the antenna into the Cable Kit, mixing with the logic signals and then radiating directly into the VHF transmitter VCO. UHF radios are not susceptible to this path.

This problem can be eliminated by the following modification to the radio Interface Board.

Add (4) bypass capacitors from each of the "MR" lines to ground as shown in Figure 5.

All units shipped from factory after August 1, 1978 incorporate these changes.

## II. "Pulsar II" Audio Feedback Oscillation

1. In systems that use extremely loud sidetone, enough gain may be available in the system loop to overcome the earpiece to microphone isolation in the "Pulsar II" Handset. This problem can usually be overcome by turning the earpiece Volume Control Potentiometer down slightly. If this does not solve the feedback problem or is not desirable due to other system considerations, additional isolation in the handset can be achieved by adding a rubber pad (Pt. No. 75-84902K02) behind the microphone. This pad should be attached by sticking it to the inside of the handset top housing in such a manner/location that when the housing is closed the pad covers the back of the MIC and the MIC grommet.

All units shipped after July 15, 1978 include this rubber pad.

## III. Auxiliary Alarm Function

### 1. In IMTS Mode

In the past the Auxiliary Alarm function of mobile telephones has been inoperative in the Standby mode if used in an IMTS system. This is because in an IMTS system the mobile will not be rung unless the terminal receives an acknowledge signal from the mobile. In the Standby mode the mobile's transmitter is inhibited, thus preventing an acknowledge signal from being sent.

A modification can be made to the Pulsar II Control Head that will permit the Auxiliary Alarm to operate while in the Standby mode. A silicon diode (Motorola Part No. 48-83654H01 or equivalent) may be added between Cradle Board U46 pin 12 and U49B pin 4 as shown in Figure 6. With this diode added, when a call is received the mobile will automatically come out of the Standby mode, acknowledge, and then automatically revert back to the Standby mode. Since the terminal will now have received acknowledge, it will ring the mobile, sounding the Auxiliary Alarm if selected.

The following PK bits and parts may be obtained at no charge until December, 1979 from your area Motorola Communication C & E Parts Office.

Reference this bulletin and include model number and serial number with each order.

(Para I. 1. "Pulsar II" Desense)

Pk. No.	Refer. Symbol	Motorola Part No.	Description	**User Price
RPX4080A	C7, 10, 13, 14 L1	21-82877B36 21-83977G03	CAPACITOR, fixed: 250 pF ±10%; 75 V COIL, ferrite bead 2-1/2 turns	\$0.93 ea. \$0.58 ea.

Order one kit per telephone

(Para I. 2. "Pulsar II" Transmitter Noise)

Pk. No.	Refer. Symbol	Motorola Part No.	Description	**User Price
RPX4081A	C13, 8, 9	21-82877B36	CAPACITOR, fixed: 250 pF ±10%; 75 V	\$0.93 ea.

Order one kit per telephone

(Para I. 2. "Pulsar II" Transmitter Noise-VHF only)

Pk. No.	Refer Symbol	Motorola Part No.	Description	**User Price
RPX4082A	C9, 10, 11, 12	21-82877B36	CAPACITOR, fixed: 250 pF ±10%; 75 V	\$0.93 ea.

Order one kit per telephone

(Para II. 1 "Pulsar II" Audio Feedback)

Motorola Part No.	Description	**User Price
75-84902K02	Pad, Rubber	\$0.30 PK/10

This is a service bulletin. No labor expense will be accepted.

2. Proper Connection of Auxiliary Relay Coil

Connecting the Auxiliary Relay Coil directly to the battery will result in the Auxiliary Alarm being activated continuously if the Cable Kit 3 amp fuse blows open.

The A+ side of the Auxiliary Relay Coil should be spliced into the Cable Kit 3 amp power line on the radio side of the 3 amp fuse.



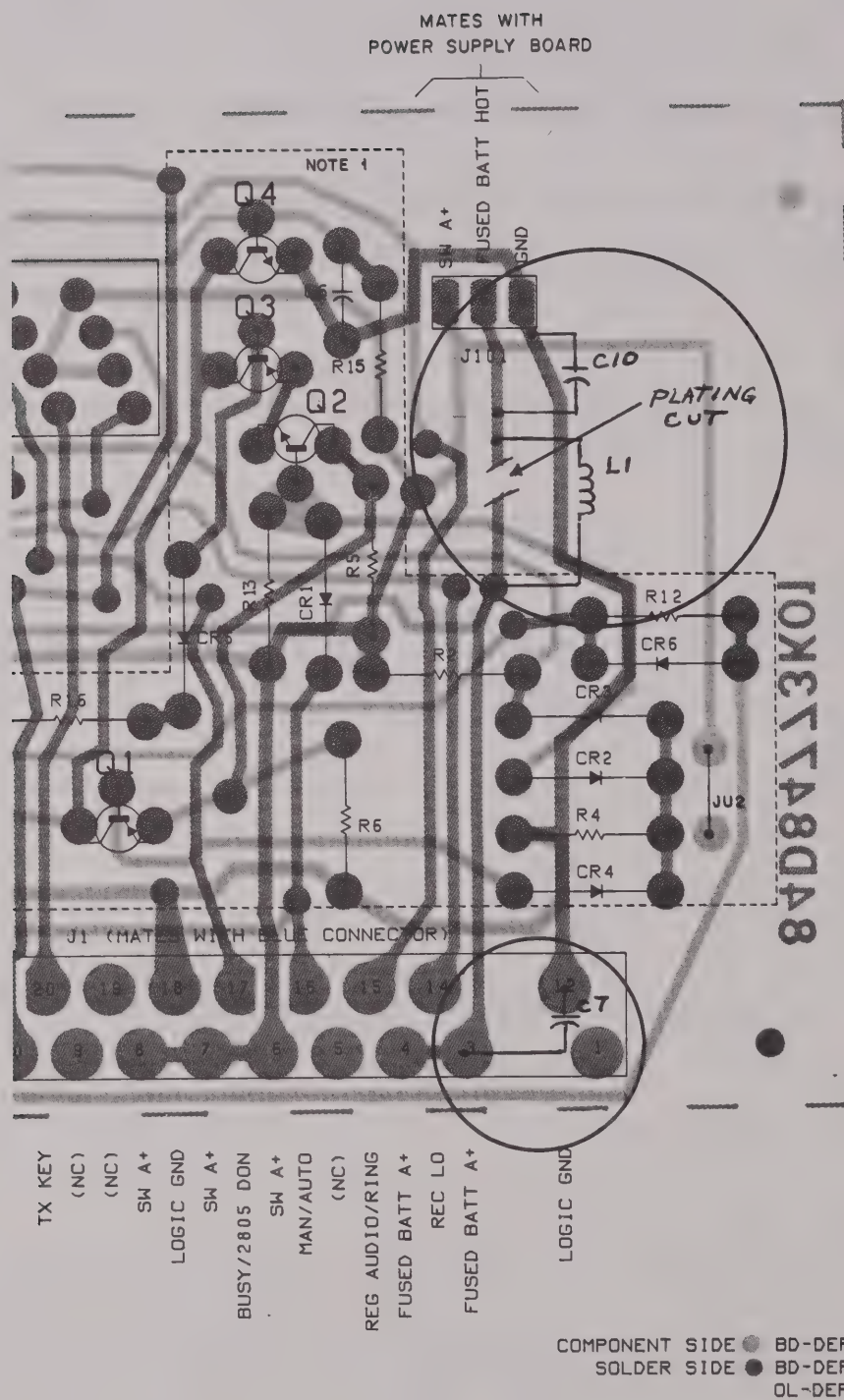
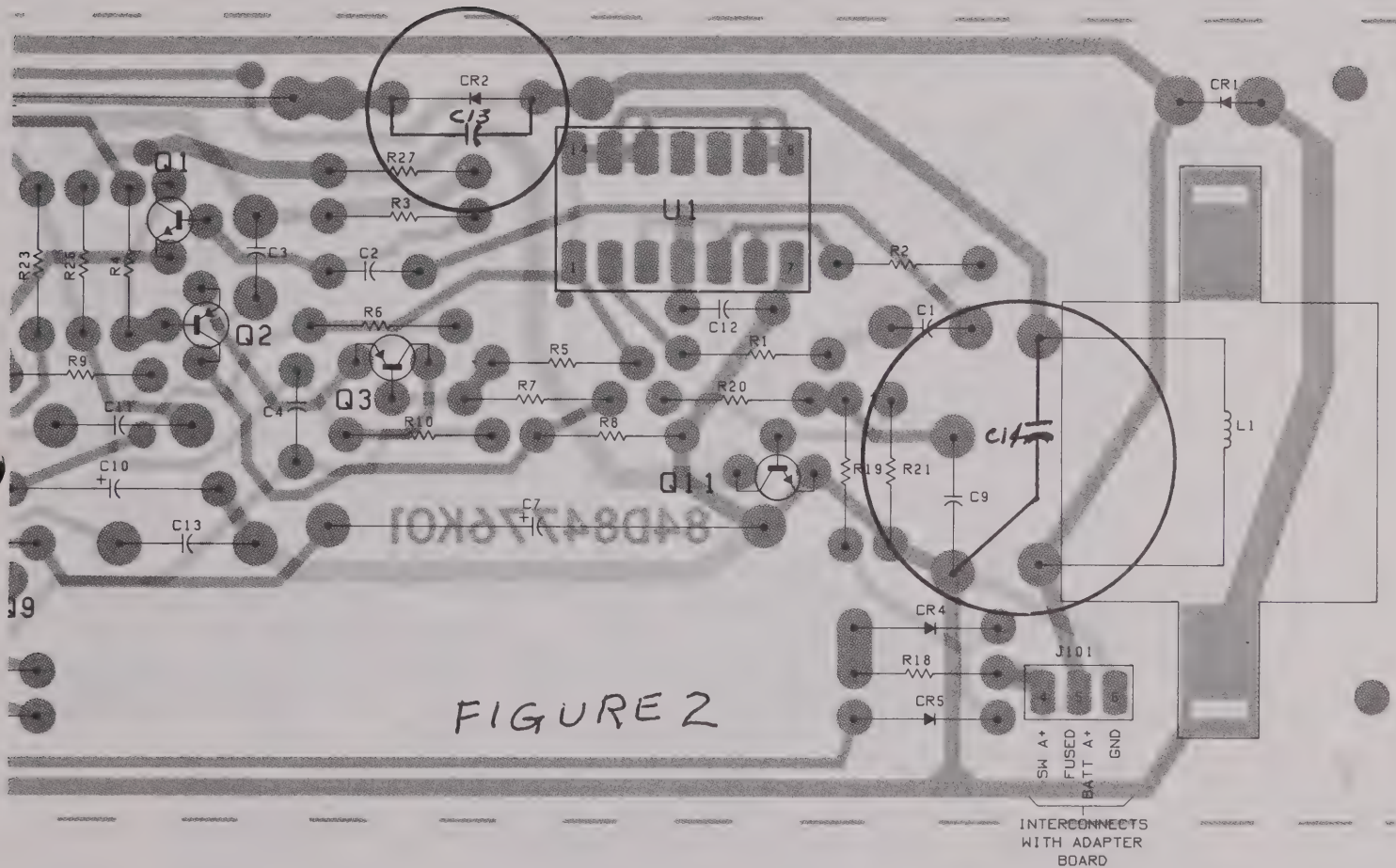


Figure 1

# POWER SUPPLY

MODEL TRN6698A





# HANDSET

MODELS TLN1845A-TLN1848A,  
TLN1980A-TLN1987A

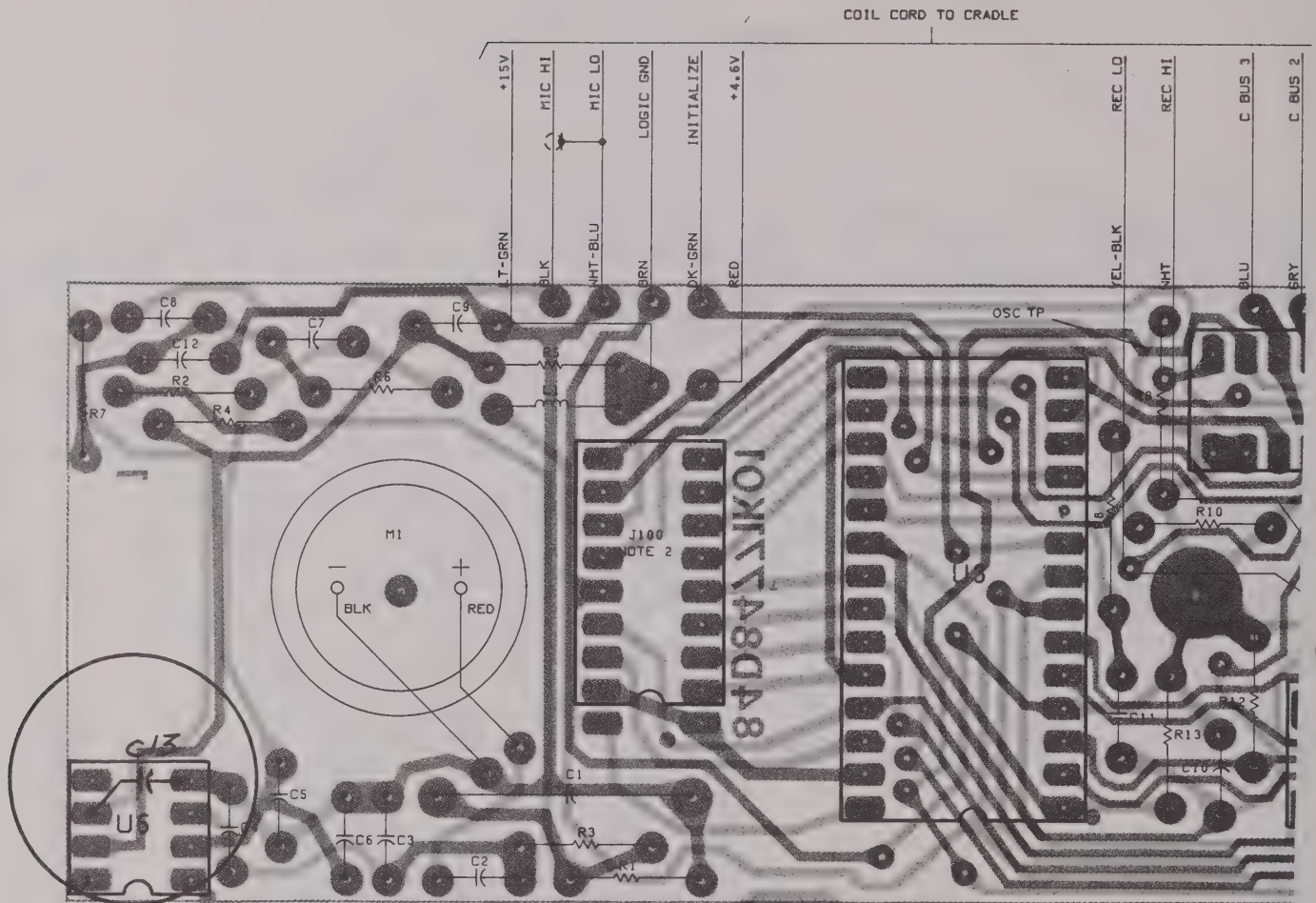
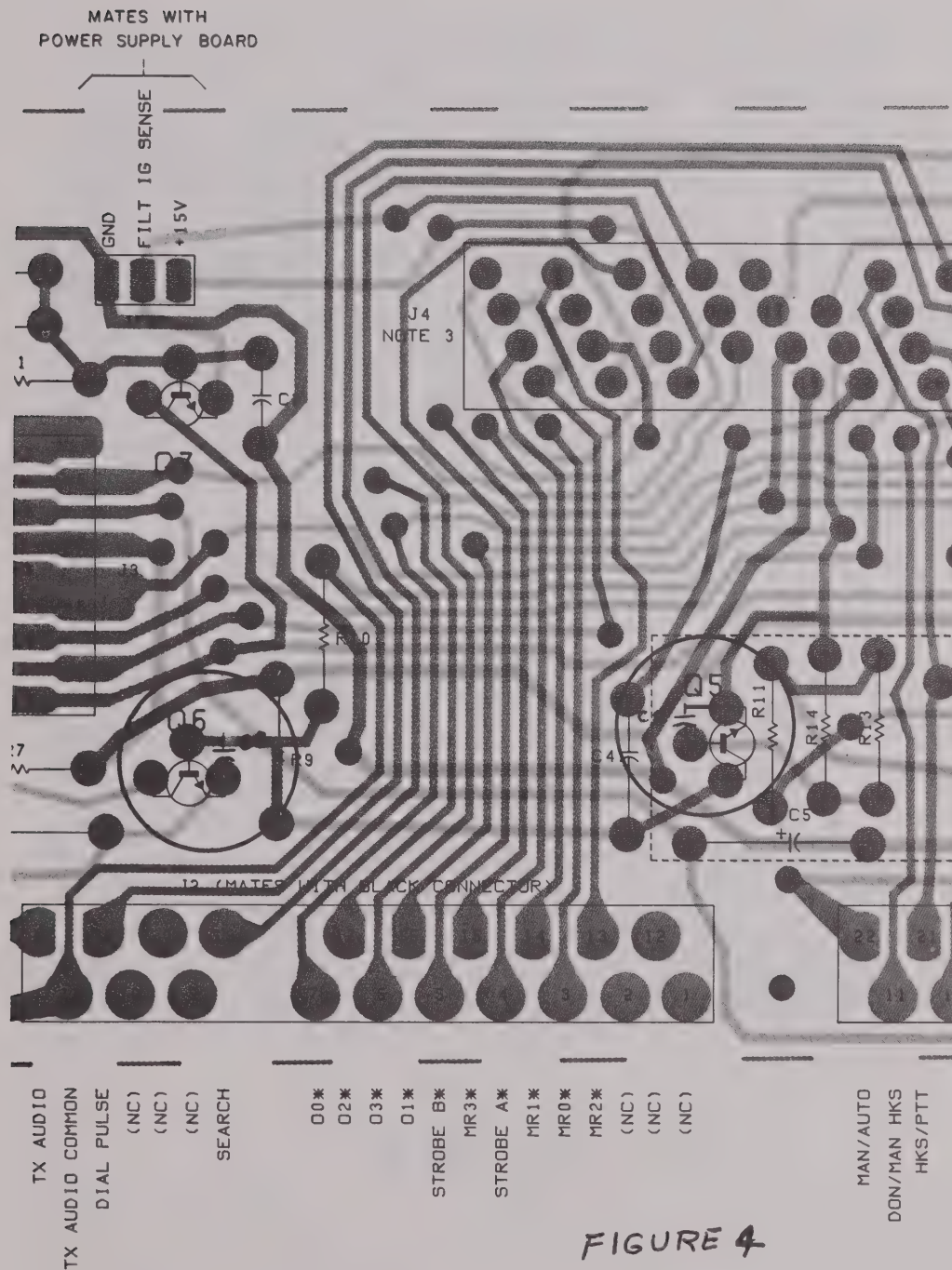


FIGURE 3

SHOWN FROM COMPONENT SIDE

# CABLE ADAPTER BOARD

MODELS STANDARD: TRN6704A  
DELUXE: TRN6748A





# UHF RADIO INTERFACE BOARD

SHOWN FROM COMPONENT SIDE

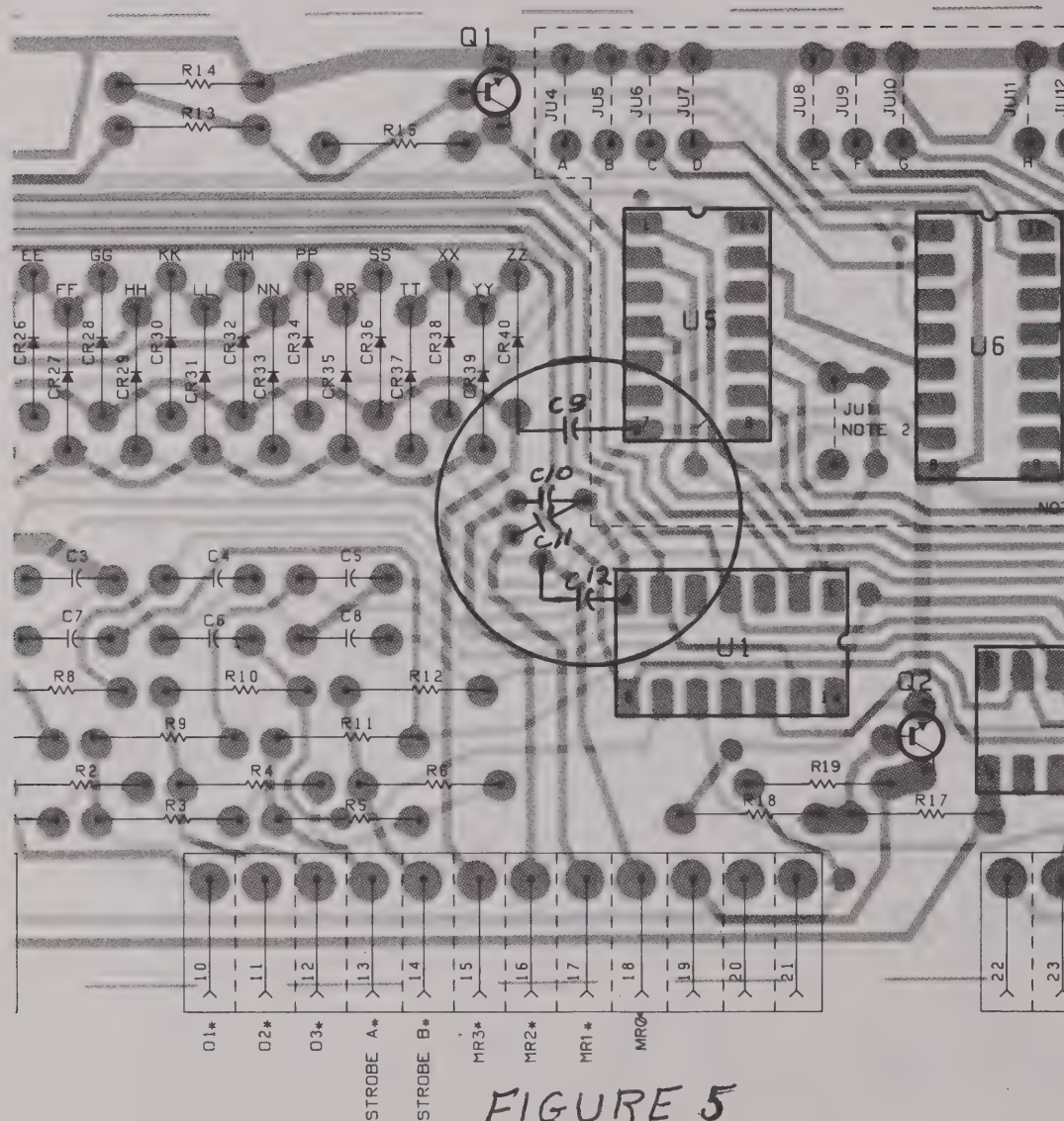


FIGURE 5

P104

**MODELS TRN6696A, TRN6697A,  
TRN6788A, AND TRN6789A**







# bulletin


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## ROUTING

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SRN-855

APC-261

June, 1979

## S1348A, B &amp; C DC Power Supply Modification Instructions

The S-1348A, B & C DC Power Supply can have a regulation problem. When depressing any one of the three programmed voltage buttons if pre-programmed for a zero volt output, the output can lock-up at approximately 35 volts. This problem has been corrected on "D" suffix models which began shipping in March, 1979. The following procedure will correct the problem:

1. - Mount a 27-ohm resistor (R40) to the terminal strip (TB1) and mount the assembly near the VOLTAGE adjust potentiometer (R16) using the voltmeter mounting stud.
2. - Remove the wht-blk wire from the VOLTAGE adjust potentiometer and connect it to one side of the 27-ohm resistor.
3. - Connect the other end of the 27-ohm resistor to the VOLTAGE adjust potentiometer where the wht-blk wire was removed.
4. - On the regulator P. C. board, replace resistor R18 (220 ohm) with a jumper.

PARTS REQUIRED

<u>REFERENCE</u> <u>SYMBOL</u>	<u>MOTOROLA</u> <u>PART NO.</u>	<u>DESCRIPTION</u>	<u>USER</u> <u>PRICE</u>
R40	6-124A11	Resistor: 27-ohms ±5%; 1/4 W	\$2.32 pk of 10
TB1	31-131744	Terminal Board	\$1.00 pk of 10

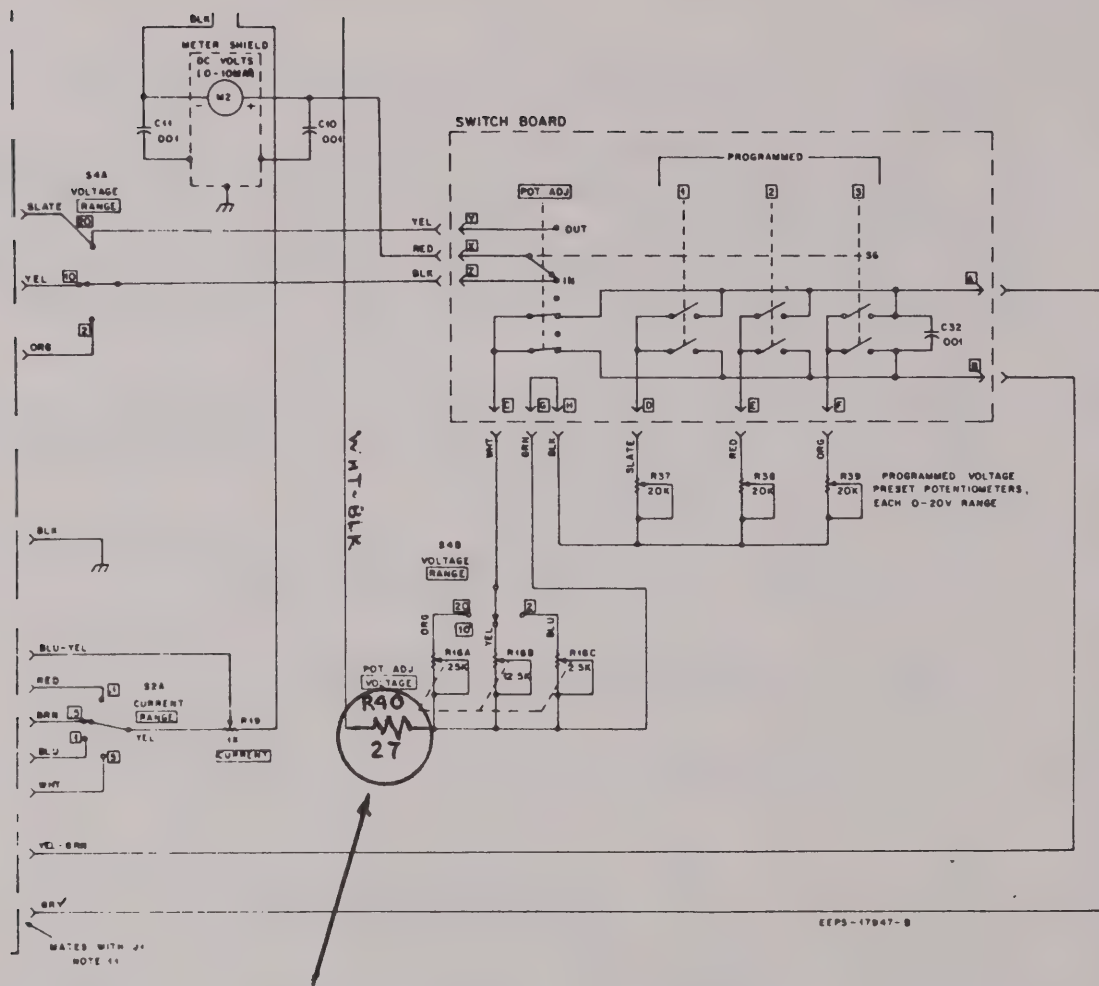
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\*Net User Price—Subject to change without notice.





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## ROUTING

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SRN-859

August, 1979

APC 213

Deadline Date: N/A

## EXPEDIENT BACK-UP REPAIR FOR PULSAR MOBILE RADIOS

Motorola provides an expedient repair back-up service for VHF and UHF Pulsar Mobiles.

To provide this special service, various strategically located Motorola Service Shops (MSS/COMSS) have been designated as qualified second echelon Pulsar Service Stations.

The criteria for designating these shops were;

1. Shop has had Motorola Pulsar training either at plant or field (FTR) school.
2. Shop has an acceptable inventory of Pulsar parts.
3. Shop has adequate test equipment for Pulsar servicing.

This special arrangement will provide customers expedient repair service and also make this repair shop service available to other local MSS shops.

The following is a list of shops per area;

- 1 of 4 -

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

EPD-21007B

## AREA A (1)

### California

Delta Industrial C & E	- Sacramento
Mobile Radio Engineers	- San Francisco
Motorola San Carlos S. C.	- San Carlos
Communication Systems & Elec.	- San Jose

### Idaho

Gem Communications	- Boise
IC&E	- Idaho Falls

### Oregon

Clackamas Communications	- Estacada
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### Utah

Utah Communications	- Salt Lake City
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### Washington

Motorola Pasco S. C.	- Pasco
Ratelco	- Seattle

## AREA B (2)

### Illinois

Motorola Midwest Depot	- Schaumburg
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### Minnesota

Capitol Electronics	- St. Paul
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### Missouri

St. Louis Electronics	- St. Louis
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## AREA C (3)

### Connecticut

Huntress Electronics	- West Hartford
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### Massachusetts

Motorola Boston S. C.	- Boston
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### New Jersey

Henry Brothers Electronics	- Paramus
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### New York

Unitied Radio Service	- Syracuse
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AREA D (4)

Missouri

Commenco

- Kansas City

Oklahoma

Mobilfone Inc.

- Tulsa

Texas

Motorola Dallas

- Irving

AREA E (5)

Alabama

Motorola Mobile S. C.

- Mobile

Huntsville Radio Service

- Huntsville

Birmingham C & E

- Birmingham

Montgomery Comm.

- Montgomery

Florida

Caribbean Radio Comm.

- Miami

Tallahassee Comm.

- Tallahassee

Georgia

Motorola Atlanta S. C.

- Atlanta

Hasty's Comm. & Elect.

- Tifton

Independent C & E Service

- Dalton

South Carolina

Sikes Radio

- Charleston

Communication S. C.

- Greenville

Tennessee

Communications Service Co.

- Nashville

Independent Comm.

- Cleveland

AREA F (6)

California

Motorola L. A. Depot

- Hawthorne

AREA N (7)

Michigan

Mobile Comm. Service

- Detroit



AREA N (7) cont.

Ohio

Motorola Cleveland S. C.

- Cleveland

Pennsylvania

Bernard Busch & Assoc.

- Clairton

AREA V (8)

Maryland

Motorola Baltimore S. C.

- Baltimore

North Carolina

Mobile Comm. Svc.

- Durham

Pennsylvania

Motorola Philadelphia S. C.

- Philadelphia

Virginia

Gately Comm.

- Hampton

AREA R (9)

Louisiana

EMCO

- Baton Rouge

Baudier Radio Comm. Service

- Metairie

Tomba Comm. & Elec.

- Marrero

Kay Radio

- Alexandria

Kay Communications

- Westlake

Mississippi

Statewide Comm.

- Jackson

Texas

Motorola Houston S. C. (OST)

- Houston

Straughn Electronics

- Beaumont

Coastal Communications

- Corpus Christi

Valley Communications

- Harlingen

Kay Electronics

- Port Arthur

Industrial Communications

- San Antonio

# bulletin

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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-867

November, 1979

APC 213

Deadline Date: N/A

POTENTIAL "CHANNEL SKIP PROBLEM" WITH VHF AND MARK VII "PULSAR" MOBILES

Models Affected	Description	Kits Affected
T1879A	VHF "PULSAR"	TLN5257B Interconnect Board
T1880B	"MARK VII PULSAR"	TRN6899A Interconnect Board

Recent field reports have indicated that some "Pulsar" mobile radio installations have experienced a channel skip problem whereby certain channels cannot be accessed. The problem is caused by coupling between adjacent channel select wires in the cable kit. Since the coupling between any two wires varies with different installations, it is impossible to predict which channels will be affected or whether any channels will be affected.

This potential problem can be eliminated during routine maintenance by removing the two (2) 0.02 uF disc capacitors which are connected across, and physically located on top of diodes CR108 and CR109 (48-83654H01) on the TLN5257B and TRN6899A Interconnect Boards. When clipping off the capacitors care must be taken not to damage the diodes.

The two (2) extra capacitors are in "Pulsar" radios shipped between September 1978 and March 1979.

If labor costs are incurred contact Product Services/Schaumburg.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Not User Price—Subject to change without notice.



# bulletin

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## ROUTING

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SRN-868A\*\*

APC-412, 425, 426, 512,  
525, 526

August, 1983

Deadline Date: N/A

**C & E PARTS SUPPORT OF AFTER MARKET DVP™ & DES MODULE PROGRAM**

Effective immediately C & E Parts will provide aftermarket support for *DVP* & *DES* modules. This service will include supplying warranty, new module sales and handling the exchange program that was previously administered through the Midwest Service Depot, as originally described in PSD bulletin number 428 and SRN868.

The *DVP* & *DES* modules involved are as follows:

MOBILE/BASE MODULETRN677A/B *DVP* (part of T1922A/B)TRN4836A *DES* (part of T1969A)T1922A/B *DVP* (includes TRN677A/B)T1969A *DES* (includes TRN4836A)MX300™ PORTABLE MODULEPLN6022A *DVP*PLN6433A *DES*MX300S™ PORTABLEStandard

NLD7890A

NLD7900A

NLE9020A

NLE9010A

SP

PLD6820A

PLD6850A

PLE7090A

PLE7110A

MODULE*DVP* VHF*DES* VHF*DVP* UHF*DES* UHF

Midwest Service Depot will no longer handle the module exchange program.

The information in this bulletin is intended to be for reference and to be used as a service aid.

-1 of 1-

\*\*Supersedes and invalidates SRN-868 issued December, 1979.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.







# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

ROUTING

MOBILE TELEPHONE SYSTEMS AND PRODUCTS

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SRN-869

November, 1979

APC-213

Deadline Date: 10/80

CHANNEL SWITCH INTERBLOCK FOR UNUSED CHANNELS

Control Heads Affected: VHF "Pulsar" 100 Telco (11 Channels)  
VHF "Pulsar" 100 RCC (7 Channels)

On the seven (7) channel and eleven (11) channel versions of the "Pulsar" 100 Control Head, there are extra channel select switches that are not used. These switches should be in a closed/locked position to prevent unauthorized channel usage. If these switches are pushed down (open position) the user will lock onto an unuseable/unauthorized channel when in manual mode and not have access to an assigned mobile channel.

The switch is shipped from the factory in the closed position, however, it is possible that during programming of the control head, the switch can be accidentally placed in the open position. In order to prevent this, a channel switch interblock, Part No. 55-83161M01 was designed into the channel select switches. Control heads shipped after July 1, 1979 incorporate this change.

For control heads shipped prior to July 1, 1979, the switch interblock part can be installed as follows:

1. Remove top housing.
2. Hold the unit so that the channel switches are near you making sure that the switches to be blocked (the #12 switch on eleven channel models and switches #8 through #14 on seven channel models) are all in a closed (up) position. See Page 2.

- 1 of 2 -

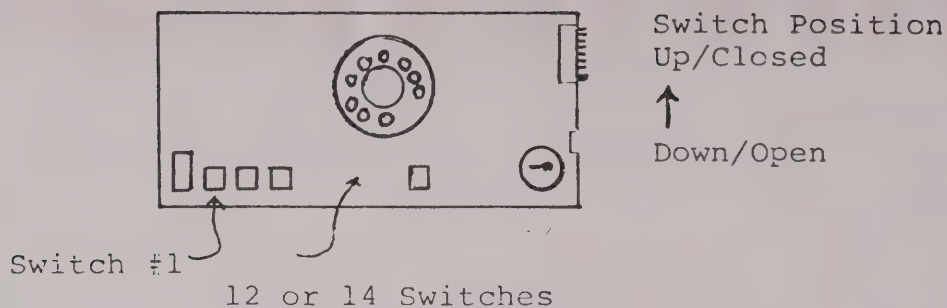
SRN-869

11/14/79

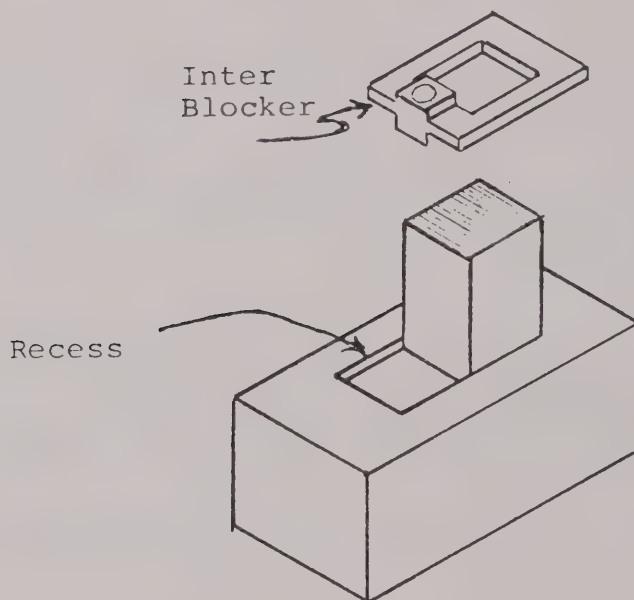
If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.



3. Push the interblock plastic part over the switch paddle so that the thicker portion of it lies in the recess in the switch as shown below:



4. Verify that unused channel switch(s) are locked in the closed (up) position and reassemble unit.

Switch interblock part #55-83161M01 is available at no charge from your local Part Depot until October, 1980 by referencing this bulletin.

#### PART REQUIRED

MOTOROLA PART NO.	DESCRIPTION	**USER PRICE
55-83161M01	INTERBLOCK, switch	\$3.15 Pk. of 5



# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-870

November, 1979

APC 213

Deadline Date: N/A

SUBJECT: ESCUTCHEONS FOR VERTICAL INSTALLATIONS OF  
"PULSAR" 100 CONTROL HEADS

The "Pulsar" 100 Control Head has the capability of having its dial and escutcheons rotated 90° for vertical installations.

The vertical escutcheons will be shipped with all "Pulsar" 100 control heads after August 1, 1979. For shipments prior to August 1, 1979, escutcheons can be obtained at no charge from your local Parts Depot by referencing this bulletin.

Installation of Vertical Escutcheons

1. To change excutcheons and rotate dial, remove top housing and refer to manual #68P81042E07-O.
2. Remove (4) screws, item #2 and rotate dial 90° counterclockwise.
3. Replace (3) of the (4) screws removed.
4. To replace channel escutcheons, remove all switch buttons and un-snap escutcheon.
5. Replace the channel vertical and dial escutcheons and re-install buttons.

See table on next page for proper escutcheon identity.

Note: The dial vertical escutcheon #TRN4011A must be ordered for all models in addition to one of the following.

- 1 of 2 -

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.



<u>Model &amp; Option</u>	<u>Escutcheon</u>	<u>Model &amp; Option</u>	<u>Escutcheon</u>
T1726AA	13-8452 1L16	T1727A	13-8452 1L16
T144	13-8452 1L29	T144	13-8452 1L29
T356	13-8452 1L19	T356	13-8452 1L19
T1726AB	13-8452 1L31	T1728A	13-8452 1L08
T144	13-8452 1L18	T144	13-8452 1L35
T356	13-8452 1L19	T356	13-8452 1L11
T1726AC	13-8452 1L08	T1729A	13-8452 1L07
T144	13-8452 1L35	T144	13-8452 1L33
T356	13-8452 1L11	T356	13-8452 1L11
T1726AD	13-8452 1L09	T1737A	13-8452 1L18
T144	13-8452 1L14	T144	13-8452 1L31
T356	13-8452 1L11	T356	13-8452 1L19
T1726AE	13-8452 1L07	T1738A	13-8452 1L09
T144	13-8452 1L33	T144	13-8452 1L14
T356	13-8452 1L11	T356	13-8452 1L11
T1726AF	13-8452 1L10	T1739A	13-8452 1L10
T144	13-8452 1L37	T144	13-8452 1L37
T356	13-8452 1L11	T356	13-8452 1L11
ZZ0601A	13-8452 1L08		
T144	13-8452 1L35		
T356	13-8452 1L11		
ZZ0602A	13-8452 1L07		
T144	13-8452 1L33		
T356	13-8452 1L11		
ZZ0603A	13-8452 1L09		
T144	13-8452 1L14		
T356	13-8452 1L11		
ZZ0604A	13-8452 1L10		
T144	13-8452 1L37		
T356	13-8452 1L11		

CONTROL HEAD NUMBER

TCN1295  
TCN1296  
TCN1297  
TCN1298  
TCN1299  
TCN1312  
TCN1313  
TCN1314  
TCN1315  
TCN1316  
TCN1317  
TCN1318  
TCN1319  
TCN1320

VERTICAL ESCUTCHEON NUMBER

13-8452 1L11  
13-8452 1L07  
13-8452 1L08  
13-8452 1L09  
13-8452 1L10  
13-8452 1L31  
13-8452 1L16  
13-8452 1L19  
13-8452 1L29  
13-8452 1L18  
13-8452 1L33  
13-8452 1L35  
13-8452 1L14  
13-8452 1L37

# bulletin

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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

ROUTING

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SRN-871

October, 1979

APC-213

Deadline Date 7/80

SERVICING AID FOR POSSIBLE SPURIOUS OUTPUT  
DEGRADATION ON "PULSAR MARK VII"<sup>TM</sup> MOBILESModels Affected  
T1880A or BDescription  
RCC Mark VII

On some of the "Pulsar Mark VII" mobiles shipped during 1975-1976, the spurious output performance could degrade. The specific symptom would be interference from another mobile at alternate channel ( $\pm 60$  kHz) from channel of operation. This interference is noticeable under certain geographical conditions, e.g. the interfering mobile is located within a mile of the base station receiver and the interfered mobile is in a weak signal area.

The following two procedures can in most cases remedy problem. It is recommended that these two methods be followed only if an interference problem is suspected or as part of normal maintenance procedures.

I. Grounding

1. To assure good grounding connections, open Power Amplifier, TLD1752A or TLD2032A heatsink. There are six (6) ground clips screwed onto the PA board. Bend these clips out slightly so that a secure contact is made to the radio chassis when the PA heatsink is closed.
2. The one ground clip, screwed onto the bottom of the Pre-Driver Board, TLD8951A/B should be secured for good grounding. Bend the clip down slightly so that a better contact is made to the radio chassis.

Note 1. In a few isolated cases, the above grounding procedure may not completely cure the problem. In that event, the following modification is recommended.

- 1 of 2 -

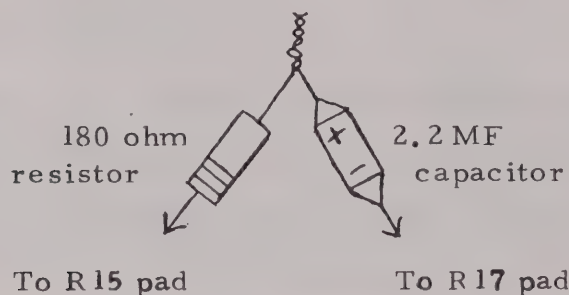
If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

## II. Power Control Board Modification

1. The Power Control Board to be modified is identified by the kit number stamped on its back side, TLN5240A. This kit identity verifies that the radio was shipped prior to October, 1978. The kit number TLN5240A-1 indicates shipment after October, 1978. This modification should only be performed on radios shipped prior to October, 1978 with the TLN5240A Power Control Board.
2. Two (2) components are added to the Power Control Board as follows;
  - a) Connect a 180 ohm, 10%, 1/4 watt resistor, Part No. 6-124C31 in series with a 2.2MF  $\pm 10\%$ , 15 volt capacitor, Part No. 23-82783B16. The positive end of capacitor is connected to resistor as shown below;



- b) Connect the resistor to the R15 pad on the component side of the Power Control Board. Refer to schematic and modified overlay, Figure 1.
  - c) Connect the capacitor to R17 pad.

Note 2. Transmitter and receive VCO's versions should be identified with kit numbers, TLD1834-1 and TLD1824B-1. If the "-1" version or higher (-2, -3 etc.) is not marked, the VCO's should be modified per field bulletins SRN849 or CTS-103.

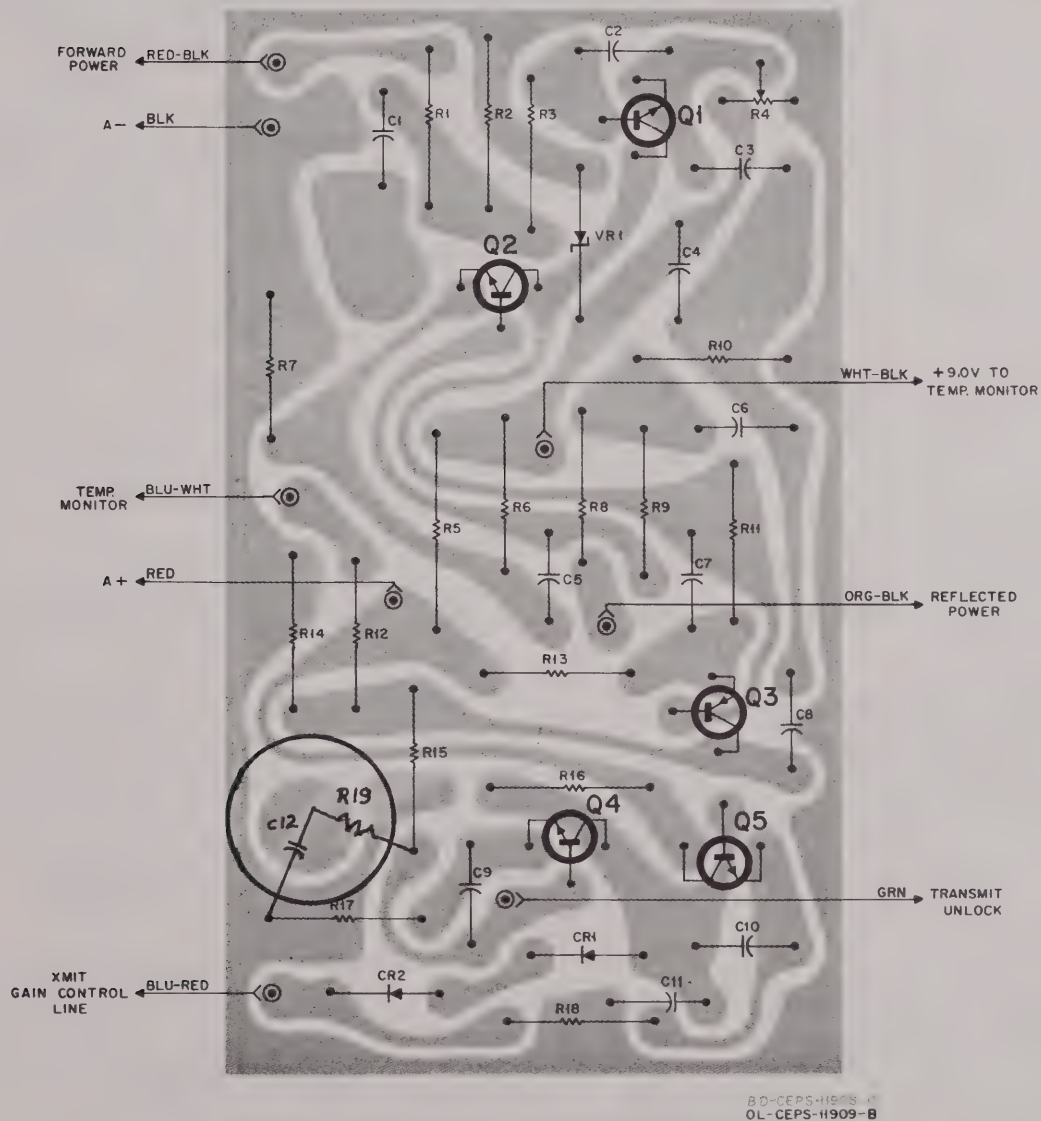
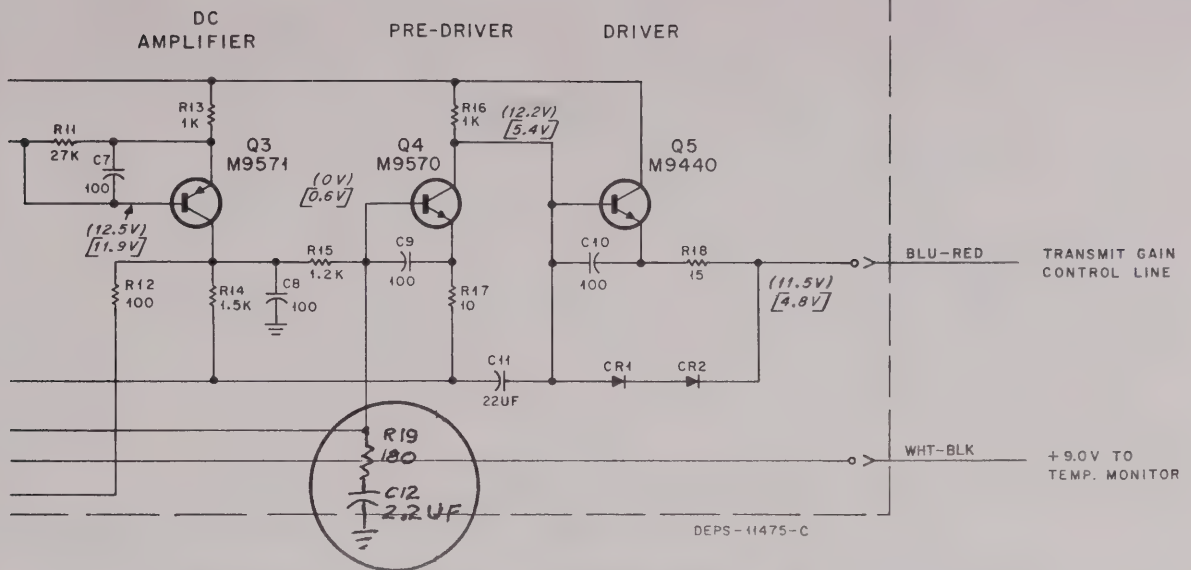
The two (2) additional parts can be obtained at no charge until Sept., 1980 from your local parts depot. Reference this bulletin and include radio model and serial numbers for each order.

Warranty labor charges to implement modification must be negotiated with Product Services.

### PARTS REQUIRED

Ref. Sym.	Motorola Part No.	Description	* User Price
R19	6-124C31	Resistor, fixed: 180 $\pm 10\%$ ; 1/4 W	1.20 PK/10
C12	23-82783B16	Capacitor, fixed: 2.2 $\mu$ F $\pm 10\%$ ; 15 V	1.58 ea.





TLN5240A Power Control Board  
Schematic Diagram and  
Parts Location Detail  
Motorola No. 63P81020E52-D  
10/22/79-UP





# bulletin

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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-872A\*\*

December, 1980

APC-213

Deadline Date: N/A

SPECIAL REPAIR SERVICE FOR UHF & VHF PULSART<sup>TM</sup> MOBILE MODULES

VHF RADIO MODELS	VHF MODULES	DESCRIPTION
T1877, 78, 79	TLD2233, 34	Frequency Generation Unit
T1727, 28, 29	TLD2232	Trisolector <sup>TM</sup>
T1880	TLD2230	Power Amplifier

UHF RADIO MODELS	UHF MODULES	DESCRIPTION
T1837, 38, 39	TLE1741	Frequency Generation Unit
	TLE1731	Power Amplifier
	TLE1761	TRISOLECTOR Assembly

A Motorola field service facility will be utilized to provide repair service for the above complex modules. This facility has been especially equipped for quick repair or replacement of these units.

With the exception of the TLE1761 TRISOLECTOR Assembly, out-of-warranty repairs will be made on a time and material basis. The TLE1761 TRISOLECTOR will be reconditioned as described in the following paragraphs.

## TLE1761 TRISOLECTORS:

In-warranty defective UHF TLE1761 TRISOLECTORS will be replaced at this facility and should not be sent to Motorola Communications Parts Department. Warranty period is one (1) year from radio unit ship date. Radio model, serial or factory order numbers must accompany each TRISOLECTOR unit for warranty replacement.

\*\* Supersedes and invalidates SRN-872 issued November, 1979.

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

Out-of-warranty defective UHF TLE1761 TRISOLECTORs (over one year from radio serial number date) will be replaced with a reconditioned unit. The reconditioning program consists of replacing all critical parts in the TRISOLECTOR and realignment of unit.

To facilitate complete testing of TRISOLECTOR, the Mixer Board must be returned as part of complete module.

A flat rate charge of \$95.00 per out-of-warranty unit has been established for this reconditioning program. This charge is based on the return of a defective TRISOLECTOR with prepaid return postage. Repairs to the Mixer Board if required will be an additional charge.

Reconditioned TRISOLECTORs will be stamped by this facility, Midwest Service Depot, to cover their normal (30) day repair warranty.

To obtain this special service, return defective TRISOLECTOR module to:

Motorola C & E, Inc.  
Midwest Service Depot  
2227 Hammond Drive  
Schaumburg, Illinois 60195

## bulletin



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## ROUTING

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SRN-874

December, 1979

APC-240

Deadline Date: N/A

IMPROVED AUDIO INTEGRATED CIRCUIT FOR "MAXAR", "MAXAR 80"  
AND "MOXY" RADIOS

MODELS AFFECTED: All "Maxar", "Maxar 80" and "Moxy" Radios

In all "Maxar", "Maxar 80" and "Moxy" radios the audio IC was recently replaced with a more rugged reliable version.

If the audio IC (51-84370A77) needs replacement, the new part no. 51-84621K80 should be used. We recommend replacing the part only during preventive or routine maintenance.

At the same time that the audio IC is replaced, there is another part that should be changed. All radios have a series network consisting of a .1 uF capacitor (8-84496D05) and a 1-ohm resistor from pin #12 of the audio IC to ground. This capacitor should be changed to a .22 uF capacitor (8-82905G32).

PARTS REQUIRED

<u>REFER</u> <u>NUMBER</u>	<u>PART</u> <u>NUMBER</u>	<u>UNIT</u>	<u>DESCRIPTION</u>	<u>*USER</u> <u>PRICE</u>
U2	51-84621K80	Low Band "Moxy", Low Band "Maxar", Low Band "Maxar 80", High Band "Moxy", High Band " "Maxar"	Integrated Circuit, M2180	\$3.15 ea.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.



<u>REFER</u> <u>NUMBER</u>	<u>PART</u> <u>NUMBER</u>	<u>UNIT</u>	<u>DESCRIPTION</u>	<u>*USER</u> <u>PRICE</u>
U11	51-84621K80	UHF "Moxy", UHF "Maxar", UHF "Maxar 80", 806-870 MHz "Maxar", High Band "Maxar 80"	Integrated Circuit, M2180	\$3.15 ea.
C52	8-82905G32	High Band "Maxar", High Band "Moxy"	Capacitor, fixed: 0.22 uF ±10%; 50 V	\$0.40 ea.
C68	8-82905G32	UHF "Moxy" "Maxar", "Maxar 80", High Band "Maxar 80" 806-870 MHz "Maxar"	Capacitor, fixed: 0.22 uF ±10%; 50 V	\$0.40 ea.
C72	8-82905G32	Low Band "Moxy", "Maxar" & "Maxar 80"	Capacitor, fixed: 0.22 uF ±10%; 50 V	\$0.40 ea.

## bulletin



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## ROUTING

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SRN-875

December, 1979

APC 433

Deadline Date: N/A

## ELIMINATION OF "MITREK" CHANNEL SCAN BUZZ

MODELS AFFECTED: "MITREK" UHF MODELS WITH "SYSTEM 90"  
CHANNEL SCAN OPTION ONLY  
HLN1002A and HLN1003A Channel Scan Monitors

There have been several Field inputs that the "System 90" channel scan monitor models HLN1002A and HLN1003A will produce a "Channel Scan Buzz" in the audio output of the UHF "Mitrek" radio. This problem can be eliminated or the Buzz level can be reduced to below -80 dB, by using a 0.1 uF disc capacitor (part no. 21-82372 C09) between pin 1 of U402 and pin 3 of U401 on the bottom of the main board of the Radio Unified Chassis. The leads on the capacitor should be as short as possible, with the capacitor placed towards the edge of the board between the two nearest mounting screws. Engineering recommends that this part should be added on a "As Required" basis only.

All "Mitrek" UHF Radios leaving the plant after December 1979, have this part incorporated into the Main Board design.

PARTS REQUIRED

<u>QTY</u>	<u>MOTOROLA PART NO.</u>	<u>DESCRIPTION</u>	<u>*USED PRICE</u>
1	21-82372 C09	CAPACITOR, fixed: 0.2 uF +80-20%; 25 V	\$1.25 PK/5

This capacitor is available from your local Motorola C & E Parts Office.

- 1 of 1 -

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.



## bulletin



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## ROUTING

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SRN 876

December 1979

APC 433

Deadline Date: N/A

"MITREK" TONE "PRIVATE-LINE" ENCODER/DECODER  
IMPROVEMENT

MODELS AFFECTED: All "Mitrek" "Private-Line" Mobile Radios  
HLN4020A Tone "Private-Line" Encoder/Decoder

To improve the general performance of the "Mitrek" HLN4020A Tone  
"Private-Line" Encoder-Decoder, a design upgrade for integrated circuit  
U1 has been made.

Initially U1 was part no. 51R84267A94; the upgraded part number is  
51-84768F76. Engineering recommends that U1 integrated circuits be re-  
placed only if the original part fails.

PARTS REQUIRED

<u>REFER</u>	<u>MOTOROLA</u>	<u>DESCRIPTION</u>	<u>*USER PRICE</u>
<u>NO.</u>	<u>PART NO.</u>		
U1	51-84768F76	Integrated Circuit	\$4.75

Item may be ordered from your local Motorola C & E Parts Office.

- 1 of 1 -

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals  
and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.





# bulletin

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## ROUTING

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SRN-879  
December, 1979APC-203  
Deadline Date: 6/30/80ERRATIC TUNING OR NO POWER OUT FAILURE OF THE LOW BAND  
"MICOR" EXCITER

## MODEL AFFECTED: TLB8160 Series Exciter

An intermittency problem has been observed in the field with our low band "Micor" radios using the TLB8160 Exciters. Engineering has narrowed the problem area to the last two stages of the exciter. The problem has shown up mostly in range 3 and 4 (TLB8163/4), but it's possible for this problem to occur on other ranges also. The cause of the problem was due to some intermittent capacitors made by supplier Elmenco (EM).

The following procedure is suggested to help isolate and resolve problem when troubleshooting low band "Micor" exciters for erratic tuning/no power out failures.

After determining the approximate location of the problem by observation of meter readings, attempt to retune the improperly operating stage. If retuning the appropriate stage restores proper operation, that stage's silver dipped mica capacitors should be individually thermally cycled (with circuit spray coolant and heat gun) in an effort to locate an erratically performing capacitor.

If retuning cannot restore normal meter readings and the supply voltages and resistance measurements on the transistor of the appropriate stage are normal, consideration should be given to the possibility of a defective (usually low capacitance or open) silver mica capacitor made by Elmenco (stamped with EM).

NOTE

Refer to TLB8160A Series Exciter Schematic Diagram in instruction manual 68P81008E35 for location of following referenced parts.

-1 of 2-

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

For exciter failure involving both "M4" and "M5", C441, C442 and C438 in that order are most prone to failure. For failure involving "M5" only C448, C444 and C445 in that order are most failure prone. When ordering replacement capacitor, order the same part numbers being replaced as listed in the instruction manual parts list; the part numbers were not changed. The above parts may be obtained from your local Motorola C & E part office.

#### NOTE

If the problem becomes too difficult to isolate defective capacitor, the technician may elect to change out all 6 capacitors. This may be a quicker and easier procedure in the long run.

Although the percentage of this type failure has been relatively small, engineering has restricted these capacitors from being used in the last two stages of this exciter. Units shipped after July 31, 1979 will not have capacitor made by this supplier (EM) in those sensitive circuits.

Please note due to the similarity of circuits and components used in our high band/UHF exciters the potential for this same problem to occur would also be there. I would suggest that if this problem is suspected in other units that the same procedure be followed as outlined for the low band exciter.

Parts will be replaced by your local C & E Part Depot at no charge by submitting a properly filled Stic 5 and referencing this bulletin number until 6/30/80.

If labor is requested to implement the above modification (after the warranty period) it must be requested and negotiated through the Product Service Department.

## bulletin



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## ROUTING

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SRN-880

December, 1979

APC-205

Deadline Date: N/A

## "METROCOM" I CONTROL HEADS IMPROVEMENT

MODEL AFFECTED: TCN1128A Control Head

There has been a product improvement in the "Metrocom" I control head alert tone devise. It has been changed from a 80-84014A01 (sonalert) to a TRN6556A. The new assembly TRN6556A alert tone should be used as a replacement whenever the original one (80-84014A01) fails.

No problem should be encountered in the installation of new part since it is a direct replacement.

NOTE: This is a service bulletin only.

PART REQUIRED

MOTOROLA  
PART NUMBER  
 TRN6556A

DESCRIPTION  
 Tone Alert Board

\*\*USER  
PRICE  
 \$190.63

Part may be obtained from your local Motorola C & E parts office.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.





# bulletin

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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

ROUTING

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SRN-881A\*\*

August, 1980

APC-227

Deadline Date: 7/30/81

RELIABILITY IMPROVEMENT FOR FULLY AUTOMATIC CONTROL  
TERMINAL, POWER INVERTERS

Models Affected: T1821A, T1822A, T1823A and T1917A  
T1824A, T1825A, T1826A with T37 Option  
TPN6091A, TPN6092A Power Supply

A reliability improvement has been made to the dc to ac power inverters, TPN6091A and TPN6092A used in Fully Automatic "PULSAR"® Control Terminals. Changes were made in the Output Multivibrator section of the inverters.

When a transistor failure occurs, any or all of the power transistors will short collector to emitter and, the resistors connected to the base of these transistors will usually be destroyed. In the 300-watt inverter, TPN6091A, the transistors are Q5 through Q12 and the associated resistors are R5 through R12. In the 600-watt inverter, TPN6092A, the transistors are Q9 through Q24 and the resistors are R9 through R24.

The improvement change consists of replacing the 2N3055 transistors in the Output Multivibrator section of the inverter with 2N6547 transistors.

NOTE

Since the inverters are a drop ship item to factory, a Motorola part number is not used. Replacements are provided by RPX kits available from Parts Depots.

"PULSAR" Control Terminals shipped after November 10, 1979 incorporate the improved transistor 2N6547. Control Terminals shipped prior to November 10, 1979 can be modified by ordering replacement kits set-up for this purpose from Parts Department. The RPX kits contain components and modification instructions.

\*\*Supersedes and invalidates SRN-881 issued May, 1980.

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

For the two (2) channel terminal, T1821A or T1824A that uses the 300-watt inverter, TPN6091A, order (1) one RPX4102A kit. The four (4) channel terminal, T1822A or T1825A that uses the 600-watt inverter TPN6092A, order (1) one RPX4103A kit. The eight (8) channel terminal T1823A, T1826A or T1917A that uses two (2) 600-watt inverters, TPN6092A, order (2) RPX4103A kits.

The RPX4102A and RPX4103A Modification Kits are available at no charge until July 30, 1981. Labor not to exceed (2) hour for the TPN6091A and (4) hours for the TPN6092A by an authorized Motorola Service Center can be charged to warranty using standard warranty procedure. Reference must be made to this bulletin including model and serial number of terminal for each order.

#### PARTS REQUIRED

<u>Motorola Model</u>	<u>Modification Kit</u>	<u>**User Price</u>
TPN6091A	RPX4102A	\$110.00
TPN6092A	RPX4103A	\$220.00

## bulletin



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## ROUTING

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SRN-882

March, 1980

APC439

Deadline Date: N/A

### CHOKE LEAD BREAKING ON 800 MHz "MICOR" MOBILE RADIOS MODEL AFFECTED: TLF6023A RF DECK

An input from the Field has indicated a potentially early failure problem on the 800 MHz RF Deck TLF6023A. It was determined that the Ferrite Bead (L801) mounted on Choke Lead (L802) caused the Lead to break due to vehicle vibration.

Engineering recommends putting a drop of RTV silicone rubber sealant on the Ferrite Bead and Choke Assembly. This will eliminate or substantially reduce the Lead breakage problem.

All production units leaving the plant after 11/10/78 have this modification installed.

This is a Service Aid only and should be done during normal maintenance period.

PART REQUIRED

MOTOROLA

PART NO.

ST-672

DESCRIPTION

Silicone rubber sealant

\*USER PRICE

\$3.91

Item may be ordered from your local Motorola C & E Parts Office.







# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-884

May, 1980

APC-213

Deadline Date: 6/30/81

## POSSIBLE TRANSISTOR FAILURE IN VHF "PULSAR" MOBILE RADIOS

## RADIO MODEL, KIT MODEL AND TRANSISTOR AFFECTED

Radio	Kit	Transistor
T1877A, T1878A	TLD8951A/B Pre-Driver Bd.	Q1
T1879A, T1880B, T1842AL	TLD1834B Receiver VCO	Q2, Q3, Q4
T1854AE, T1854BA, T1854BE	TLD1824B Transmitter VCO	Q2, Q3, Q4

Recent field reports have been received involving early failures of the transistors, Part No. 48-869757, in radios manufactured between January 1, 1979 and August 31, 1979. The transistors that failed have been analyzed and some were found to have defective wire bonds (B-E junction) internal to the package, which were at or below minimum specification for bond strength.

Under certain conditions of thermal shock, as would be encountered by a transistor mounted on a PC board that undergoes a rapid temperature change, a weak wire bond may rupture causing the transistor to fail. A failure of any one of these transistors will produce the general symptoms given in Table 1.

Verification of a VCO transistor failure may be accomplished without removing the VCO from the radio as follows:

1. Remove the 2 screws on the top of the VCO.
2. Pull cover up and off.
3. Check for emitter voltages given in Table 1 by probing the points shown in Figure 1.
4. Verification of a Pre-Driver transistor failure can be accomplished by plugging the Pre-Driver Board into the bottom of the Interconnect Board and measuring the dc voltage at the emitter of Q1 (Figure 2).

NOTE

To test the Transmitter VCO and the Pre-Driver the radio must be keyed-up.

-(OVER)-

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

To replace the defective transistor found in the above procedure, the following steps should be taken to disassemble and reassemble either the receiver or transmitter VCO. To remove the VCO from the radio, the Supervisory Board, along with the logic shield and board puller must be removed.

NOTE

Refer to the Mechanical Parts Identification Detail  
in the Interconnect Board section of the manual provided with the radio to locate these items.

A. Disassembly Procedure

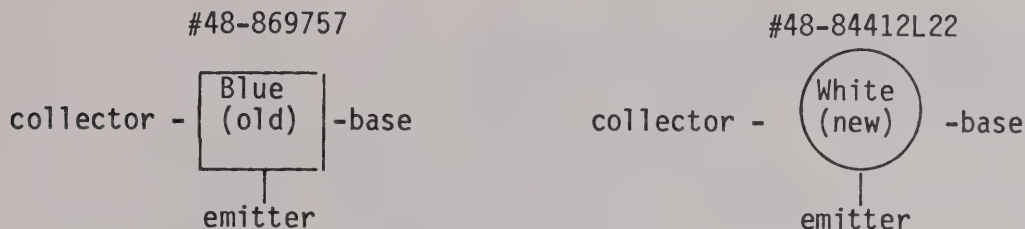
1. Loosen screws on bottom of Interconnect Board and lift VCO from radio.
2. Remove 2 screws from bottom of VCO and the black spacer feet.
3. Remove remaining 2 screws from bottom of VCO and gently pull bottom board off of the bracket post.
4. Remove 2 screws holding center board to brackets.
5. Remove 2 screws holding top of board to brackets.
6. Twist brackets away from board assembly. (Cut wires to bracket phono plugs if necessary.)
7. For ease of reassembly do not cut the board interconnect wires at the top board. If further disassembly is desired, unsolder the 3 wires and 2 capacitors between the top and center board at the VCO (center board).
8. Replace all three transistors Q2, Q3 & Q4.

B. Reassembly Procedure

1. Replace phono plug wires if they were cut (Step 6 of disassembly). Remove solder from holes in PC board.
2. Screw top and center boards on to brackets. (Align capacitor leads into proper holes if disassembly Step 7 was used.)
3. Resolder phono plug wires to top board.
4. Resolder 2 capacitors and 3 wires to center board (if disassembly Step 7 was used).
5. Gently align bottom board over bracket posts and attach with 2 screws in holes near the outer edges of the board. Check to see that wires have not been pinched during reassembly.
6. Attach 2 black spacer feet to the bottom of the assembly.
7. Replace cover checking to insure that the tuning hole in the cover lines up with the VCO coil.

8. Replace the VCO assembly in the radio using the alignment tabs projecting from the bottom of the VCO assembly as a guide.
9. Check the control line voltage and reset to 4.6 V if necessary.

The following sketch illustrates the lead configuration and identity of the old and new devices.



Motorola will replace at no charge any transistor, 48-869757, that suffers a B-E open in the above listed models shipped between January 1, 1979 and August 31, 1979 until June 30, 1981.

Replacement transistors #48-84412L22 can be ordered from your local Parts Depot by referencing this bulletin number and serial number of radio.

Labor not to exceed 1 hour by an authorized Motorola Service Center can be charged to warranty using standard warranty procedure.

Table 1. Transistor Failure Verification

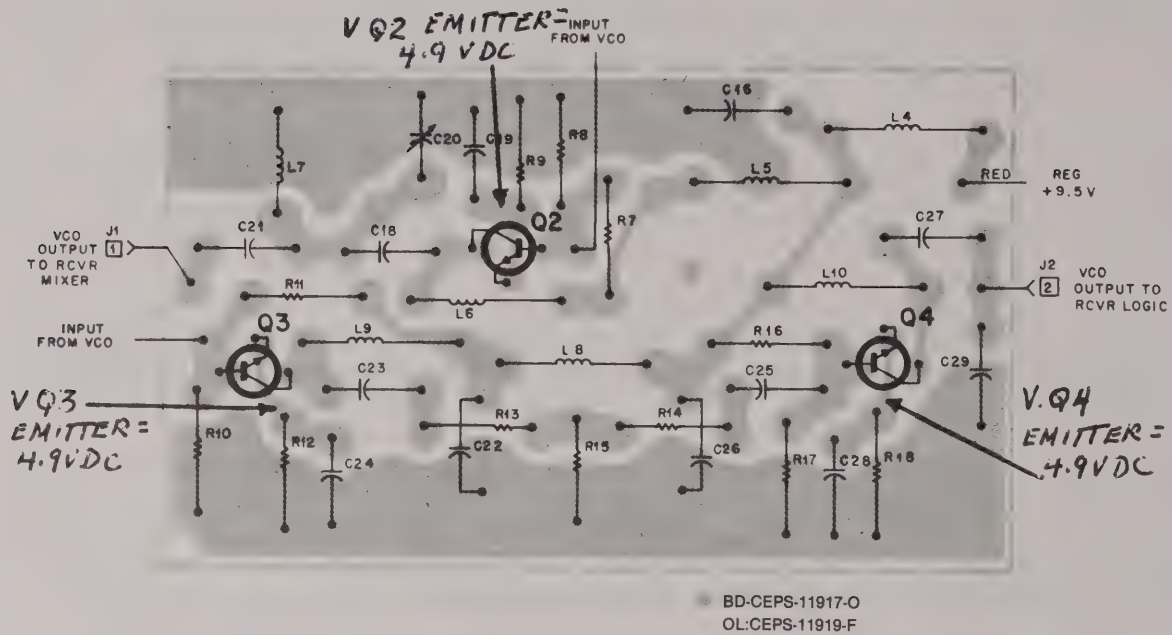
Failure	Symptom	Voltage Check*
Q1 Pre-Driver	No or low transmitter Power Out	Check Q1 Emitter Voltage (4.6 V)
Q4, Q3-Receiver VCO	Poor Sensitivity Receiver Loop Unlocked	Check Q4 Emitter Voltage (4.8 V) Q3 Emitter Voltage (4.9 V)
Q2	Poor Sensitivity Receive Loop Locked But no or low output from VCO port 4	Check Q2 Emitter Voltage (4.9 V)
Transmitter VCO		
Q3, Q4	No or low VCO output Transmit loop unlocked	Check Q4 Emitter Voltage (4.8 V) Q3 Emitter Voltage (4.6 V)
Q2	No transmitter Transmit loop locked but no or low output from VCO port 4	Check Q2 Emitter Voltage (4.5 V)

\* A base-emitter open will result in 0 volts being measured at these circuit nodes.



# TLD1834A/B RECEIVER VCO (A11)

## BUFFER



# TLD1824A/B TRANSMITTER VCO (A12)

## BUFFER

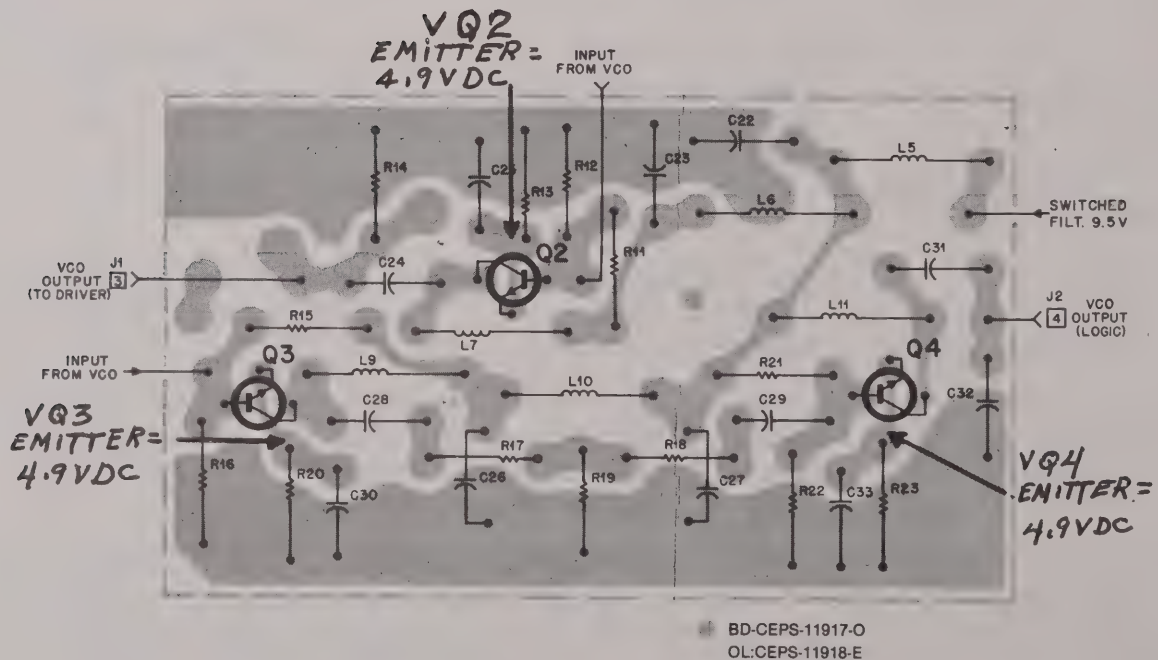
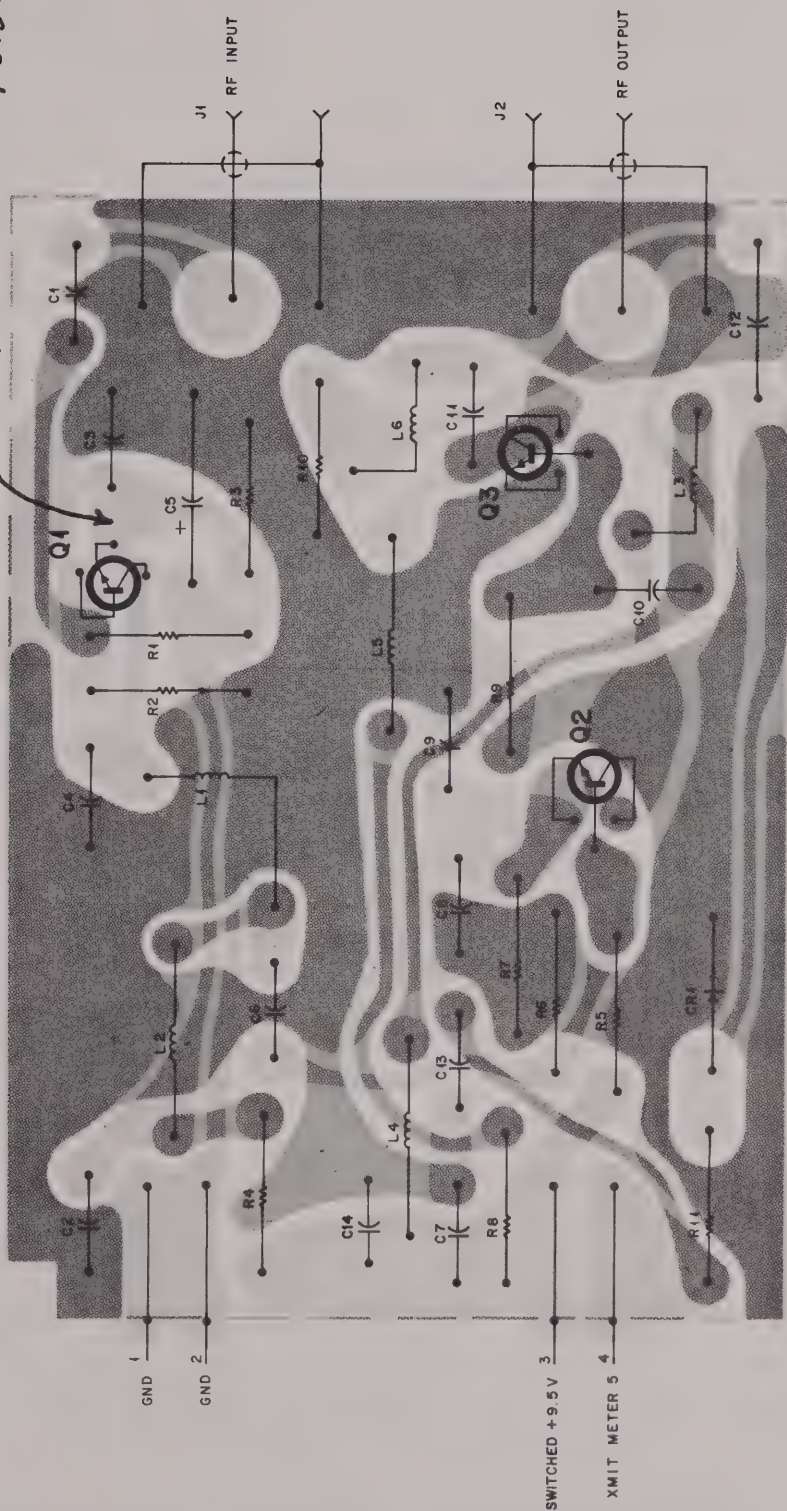


Figure 1.

V Q1 EMITTER = 4.6VDC



SOLDER BD DEPS-11920-O  
COMPONENT ● BD DEPS-11924-O  
OL CEPS-11922-C

Figure 2.





# bulletin



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## ROUTING

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SRN-886

February, 1980

APC-448

Deadline Date: 8/1/80

## INTERMITTENT CRADLE HANG-UP SWITCH IN SERIES-80 DESK TOP CONTROLLERS

## MODELS AFFECTED:

DESK SET MODEL	TYPE	MODIFICATION KIT REQUIRED
T1903A_, T1904A_, T1884A	LOCAL	RPX4106A
T1901A_, T1902A_, T1881A, T1882A	DC REMOTE CONTROL	RPX4107A

Intermittent hang-up switch performance may occur in some units of the above models that were shipped prior to 12/1/79. The problem may be caused by transformer leads and/or out of tolerance parts in one or several locations including the S205 leaf switch, the associated hang-up button or Pal nut.

Corrective action field modification kits, with installation instructions, have been made available to correct those units exhibiting the problem. These kits, (see Table above) are available, from your Motorola C & E Parts Department. They can be obtained at no charge if unit model number and serial number are submitted with a request to the Parts Dept. and reference made to this field bulletin SRN number. Motorola Service Center labor charges, up to 1/2 hour maximum per unit modification, will be accepted if processed via the standard warranty claim form and reference is also made to this field bulletin number.

Field modification labor charges will only be accepted from authorized Motorola Service Centers. Expiration date is 8/1/80. A special modification tool part number 66-80341A18 is needed and will also be furnished at no charge on a one time only basis if specified simultaneously with the first mod kit request.

Remote control units are much less likely to exhibit the problem than local control units. Properly working units should not be modified.

- 1 of 1 -

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference..

\*Not User Price—Subject to change without notice.





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## ROUTING

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SRN 888

March, 1980

APC 433

Deadline Date: N/A

IMPROVED TRANSISTOR RELIABILITY FOR LOW BAND, LOW  
POWER, "MITREK" RADIOS

MODELS AFFECTED: T51JJA Series, 29.7-50 MHz, 60-Watt

"Mitrek", Low Power, Low Band Radios, (below 35 MHz) which were built before 12/1/79 may have capacitor C807 installed on the power amplifier board.

Engineering investigation has determined that removal of C807 will reduce the dissipation in the Q807 driver transistor and thereby increase the transistor's reliability.

Engineering recommends that all 60-Watt, low band units be checked during routine maintenance to see if this capacitor is included. If the part is included and the transmitter frequency is below 35 MHz, the capacitor should be removed and the radio should be retested.

-1 of 1-

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-889

March, 1980

APC-213

Deadline Date: 12/31/80

## TONE SIGNALING AND VOICE SIMULTANEOUS ON SAME CHANNEL USED IN 2805 Hz RCC MANUAL SYSTEMS

Models Affected	Description	Filter Kits Required
T1880A/B	"Pulsar Mark VII" VHF	TLN2000A
T1879A	"Pulsar II" VHF	TLN2000A
T1879B/C	"Pulsar II" New VHF	TLN2130A
T1839A/B	"Pulsar II" UHF	TLN2130A
T1729A/B	"Pulsar 100" VHF	TLN2130A
T1739A/B	"Pulsar 100" UHF	TLN2130A
T148, T169, T170, T172	All "Pulsar" I, MK Options	Depends on Radio used

The above VHF and UHF RCC "Pulsar" Car Telephone radios using Motorola Control Heads may experience a system problem when used with certain RCC Manual 2805 Hz System Terminals. This problem is usually evident upon a call being missed while there is voice activity on the channel.

If a call comes in on a calling channel while conversation is taking place, signaling may occur simultaneously with voice on that same channel. The sensitivity of the radio Supervisory Unit is such that the radio will not always decode an incoming (2805 Hz) call over voice with a system signaling deviation of 1.5 kHz, thus resulting in a missed call.

To resolve this system problem, a narrow band 2805 Hz filter has been designed to filter out voice and decode the incoming call with voice on the channel.

The 2805 Hz Filter Board Accessory Kit numbers are TLN2000A for earlier version VHF RCC radios, and TLN2130A for new VHF or current UHF RCC radios.

SRN-889

2/27/80

-1 of 2-

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.



The TLN2000A and TLN2130A Filter Kits are available at no charge until December 31, 1980. Labor not to exceed 1/2 hour by an authorized Motorola Service Center can be charged to warranty using standard warranty procedure. Reference must be made to this bulletin including model and serial numbers of radio for each order.

All new orders for radios to be used on this type of 2805 Hz system will have the filter board kits installed and tested automatically by use of a T413 option. This option must be used only if signaling and voice occur simultaneously on the same channel. Other 2805 Hz systems do not require the filter board kits and the option is not necessary.

These filter board kits are also necessary whenever a Motorola "Pulsar" mobile is used on a Secode "SMART" system. Refer to SRN-844 for more information. This particular problem has been resolved by adding the filter boards to all T195 options and conversation kits.

Kit Required

<u>Model No.</u>	<u>Description</u>	<u>**User Price</u>
TLN2000A	VHF Filter Board Accessory Kit	\$75.00
TLN2130A	UHF Filter Board Accessory Kit (for new VHF and current)	\$75.00



# bulletin

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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN - 890

May, 1980

APC 213

Deadline Date: April 30, 1981

"PULSAR 100" CONTROL HEAD IMPROVEMENTS AND FUNCTIONS

## MODELS AFFECTED:

Telco and Bell Models	Control Heads
T1727A, B VHF Bell T1728A, B VHF Telco T1726AA, BA, AC, BC; VHF Bell, Telco Conversion Kit T1737A, B UHF Bell T1738A, B UHF Telco T1726AB, BB, AD, BD; UHF Bell, Telco Conversion Kit ZZ0601A, B VHF Telco Spare ZZ0603A, B UHF Telco Spare	TCN1313A VHF Bell TCN1297A VHF Telco TCN1315A VHF Bell Non-manual TCN1318A VHF Telco Non-manual TCN1312A UHF Bell TCN1298A UHF Telco TCN1316A UHF Bell Non-manual TCN1319A UHF Telco Non-manual TCN1314A Automatic Bell TCN1295A Automatic Telco
RCC Models	Control Heads
T1729A, B VHF RCC T1739A, B UHF RCC T1726AE, BE, AF, BF; VHF, UHF Conversion Kit ZZ0602A, B VHF, RCC Spare ZZ0604A, B UHF, RCC Spare	TCN1296A VHF, RCC TCN1299A UHF, RCC TCN1317A VHF, RCC Non-manual TCN1320A UHF, RCC Non-manual

(OVER)

5/21/80

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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\*Net User Price—Subject to change without notice.

Modifications have been made to improve the operating performance of the "PULSAR 100" Control Head by preventing improper operation especially when used in an unauthorized manner.

The pertinent items are categorized as follows:

- I. Transmit on Incorrect Channel
- II. Bootleg Disconnect
- III. Mechanical Hookswitch Bounce
- IV. Microphone Audio Muting
- V. Proper Connection of Auxiliary Relay Coil
- VI. Audio Feedback
- VII. Connector Housing

Notes:

- 1. Caution and special care should be exercised when making modifications due to the presence of CMOS devices in control head circuitry. The use of a ground strap is required to prevent possible damage to these devices.
- 2. Parts will be supplied by your local area parts depot free of charge until 4/30/81. When ordering parts, reference this bulletin and include the model number and the factory order number of the "PULSAR 100" Control Head.
- 3. Circuit modifications of the preventive items, I and II, should be made as conditions warrant. The improvement items III, IV, V, VI and VII can be implemented as control heads are returned for routine maintenance, or per customer complaint request.
- 4. Since this is a service aid bulletin, no warranty labor costs will be accepted.

I. Transmit on Incorrect Channel

This section requires careful attention since the user who resorts to unauthorized use of his control head may inadvertently transmit on

non-allocated channels.

Channel Scan Modification To Prevent Inadvertant Transmitter Key-Up  
On A Wrong Channel When No Channels Are Accessed.

1. Early version "PULSAR 100" Control Head (all models) shipped prior to September, 1979 may have the following problem with old style VHF radios in the following non-authorized manner. In the manual mode with no channels accessed (no buttons down), depressing the push-to-talk button will inhibit an old-style VHF synthesizer on any one of the 16 channels addressed by the control head and allow the transmitter to key-up. Some of these channels will be out of the allocated number of channels of the particular system.

To prevent transmitting on non-allocated channels, the channel reset diodes and reset circuitry must be present, and in the proper configuration on the control head TRN8336A and TRN8624A Cradle Circuit Boards. Positions for the proper parts are available on the boards. Control heads presently used with old style VHF radios must be modified to include these parts, if they are not already present.

2. Approximately 250 control heads including all models were shipped with improper channel reset circuitry starting with the first shipments.

The proper reset circuitry was initiated into production after September, 1979. All heads shipped after this date contain the proper reset circuitry and can be identified by a suffix "1" or "2" after the model number stamped on the control head.

3. In order to reset properly, IC U10, and resistors R12 and R28 must be in (see Figure I-1), and diodes CR44 through CR48 must



be in according to the following table:

DIODE IN / OUT TABLE

Maximum number of channels in system	CR44 "A"	CR45 "B"	CR46 "C"	CR47 "D"	CR48 "E"
7 (VHF RCC)	IN	IN	IN	OUT	OUT
11 (VHF TELCO)	IN	IN	OUT	IN	OUT

Jumper, JU5, if present, must be removed before installation of U10. The modifications are made by referring to both the "PULSAR 100" cradle board schematic and the cradle board layout diagram located in service manual 68P81037E50.

NOTE: The anode of diode CR44 has been erroneously left unconnected by circuit board metallization; the anode must be connected as shown on the cradle board schematic by either using an extra diode lead length or by a short jumper wire.

4. The parts needed for modification are:

REFER. NUMBER	MOTOROLA PART NO.	DESCRIPTION	*USER PRICE
CR44 thru 48	48-83654H01	DIODE, silicon	\$0.43 ea
U10	51-82884L10	INTEGRATED CIRCUIT	\$1.32 ea
R12	6-124C87	RESISTOR, 39-10-1/4 W	\$1.29 PK/10
R28	6-124C97	RESISTOR, 100k-10-1/4 W	\$1.29 PK/10

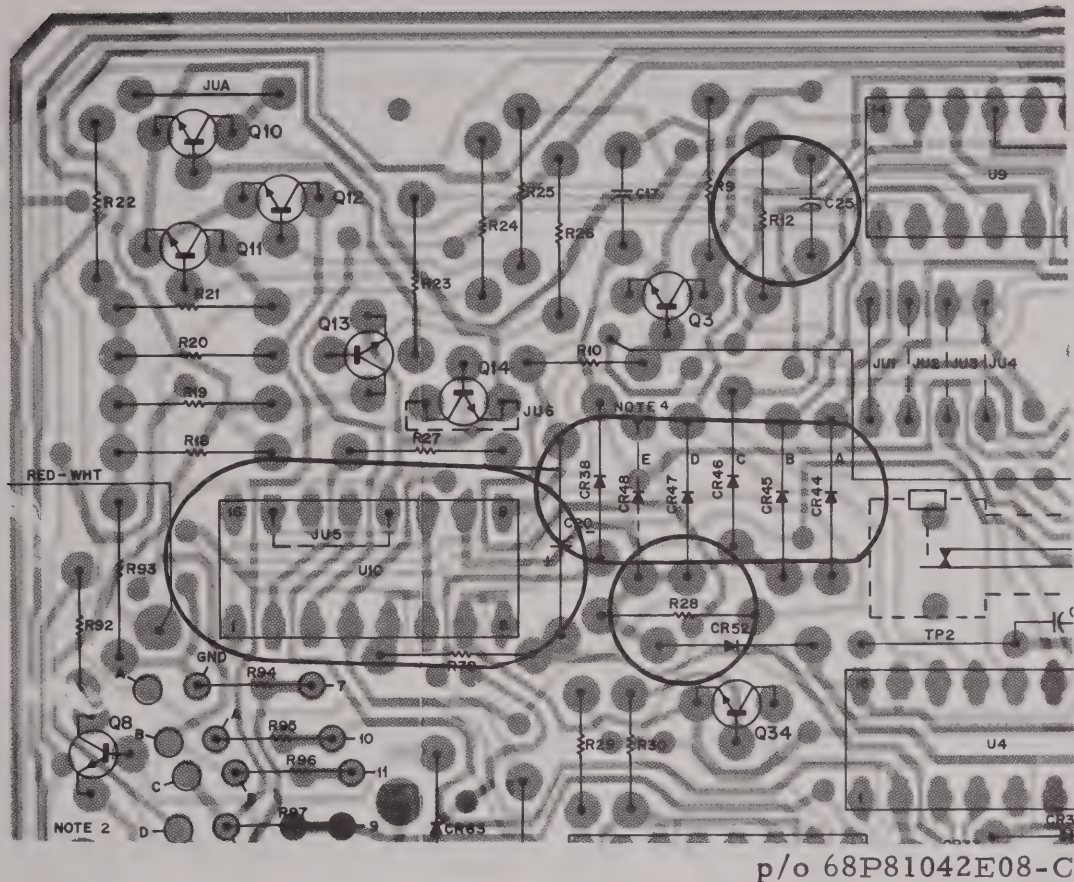


Figure I-1. Cradle Circuit Board Partial Diagram

NOTE: Refer to "PULSAR 100" Control Head service manual, 68P81037E50-A or B, cradle board and schematic diagram 68P81042E08-B or C.

## II. Bootleg Disconnect

The modification recommended in this section prevents disconnect of another user when operating the "PULSAR 100" in an unauthorized manner.

1. A Telco or Bell Control Head can switch to the first channel from any other channel while transmitting in the automatic mode if the mode switch is moved from Roam to Home. After the switch is made the transmitter will remain keyed, and upon hanging up, disconnect will be transmitted on the first channel.
2. All Telco and Bell Model Control Heads are affected (refer to



page 1 for model numbers). Control heads manufactured after September 1, 1979 and are identified with a suffix "1" or "2" after the control head model number have been factory modified to prevent the problem. The modification to prevent "bootleg disconnect" should be made on units as they are returned for normal service maintenance.

3. To prevent the problem, a silicon diode (part number 48-83654H01) must be added to the cradle board. The diode should be added to the solder side, anode to U10 pin 9, and cathode to U3 pin 12; refer to Figure II-1 for the recommended location. Sleeving should be added to the exposed diode leads.

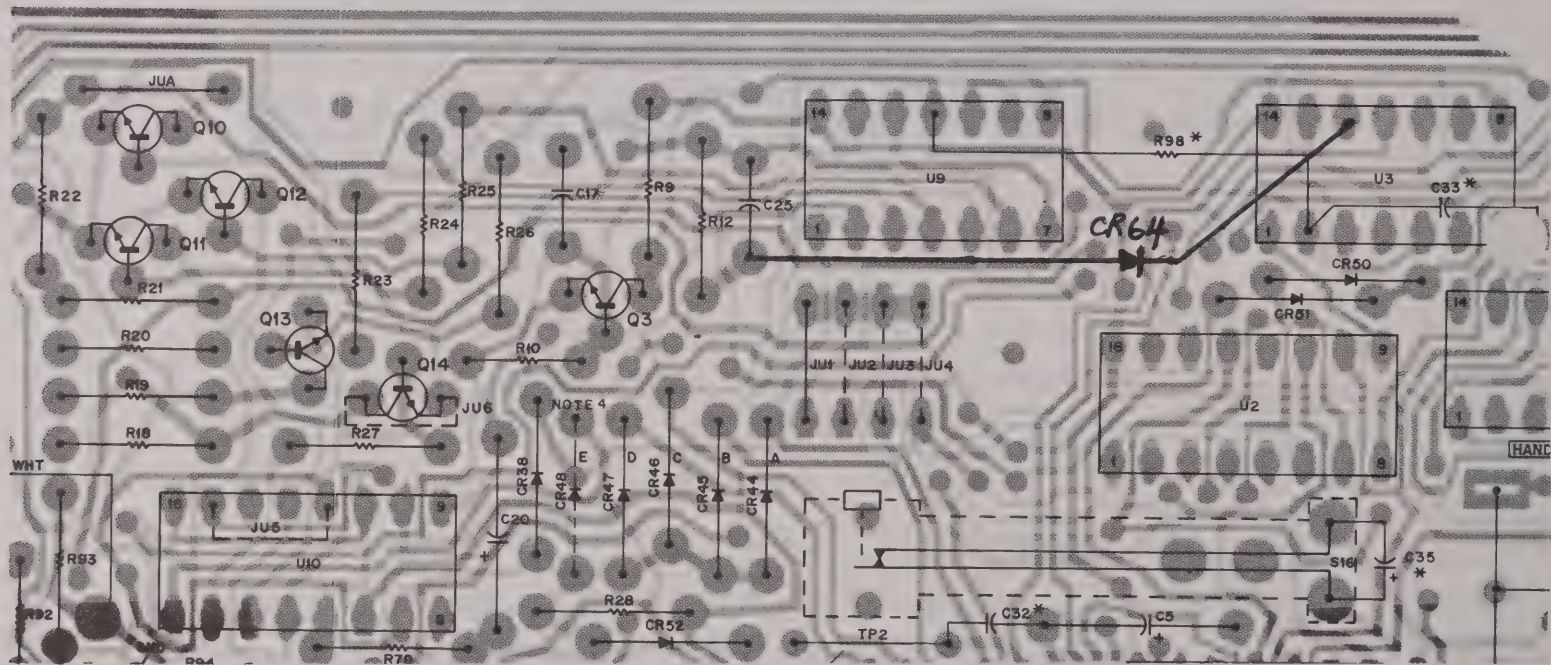


Figure II-1. Cradle Circuit Board Partial Diagram

NOTE: Refer to "PULSAR 100" Control Head service manual 68P81037E50-A or B, cradle board and schematic diagram 68P81042E08-B or C.

### III. Mechanical Hookswitch Bounce

This section covers improvements in the general operating characteristics of "PULSAR 100" Control Head.

1. Excessive mechanical hookswitch bounce can sometimes occur when the "PULSAR 100" Control head is subjected to severe shock or vibration. If the handset is removed from the cradle, as in making a phone call, the leaf switch (hookswitch) contacts could momentarily open, causing an RCC control head to unlatch the transmitter (in the manual mode) or cause the control head to re-key itself during revertive operation. Under conditions of extreme vibration an RCC or Telco Control Head may experience audio breakup due to the hookswitch muting and unmuting the audio path. From initial production, the hookswitch leaves have been adjusted to minimize these effects and are tested for proper performance. However, additional circuitry can be added to the cradle board to effectively "filter" out intermittent switch "opens" during shock or vibration.
2. All "PULSAR 100" Control heads requiring improved hookswitch bounce "filtering" can be modified in the same manner. Only those control heads exhibiting the above problems should be modified.

All RCC Control Heads manufactured after September 1, 1979 that have a suffix "1" or "2" and all Telco Control Heads manufactured after May 15, 1980 have suffix "4" after the model number stamped on the head have been factory modified and should not exhibit the problem.

3. The modification is as follows. Refer to Figure III-1 for the recommended part placement positions and PC board runner cut. On both RCC and Telco and Bell Control Heads, add R66 and C7; refer to Figure III-1 for location. Do not solder C7 in yet as a



jumper wire will also be added later.

On RCC Control Heads, add C35, a 22 uF capacitor, across the leaf switch (hookswitch), S16, on the solder side of the cradle board. Refer to Figure III-1 for proper polarity, making sure that the positive lead of the capacitor is attached to the S16 switch lead closest to the channel switches. Also, make sure that C35 does not block the access hole to volume pot R77.

On all control heads, Telco, Bell, and RCC, the following additional circuitry change must be made. Cut the circuit board metalization runner on the component side leading from U1 pin 11, as shown in Figure III-1. Add an insulated jumper wire (eg., #24AWG, stranded) from U1 pin 11 to the negative end of C7, and complete the soldering of C7. The PC runner must be cut on the component side; the jumper can be added to the solder side.

#### 4. Modification Parts List

REFER. NUMBER	MOTOROLA PART NO.	DESCRIPTION	*USER PRICE
C35	23-82397D54	22 uF, $\pm 20\%$ , 20 V	\$0.85 ea
R66	6-00124C65	4.7k, 10% 1/4 W	\$1.29 PK/10
C7	23-84762H05	4.7 uF, $\pm 20\%$ , 25 V	\$0.66 ea

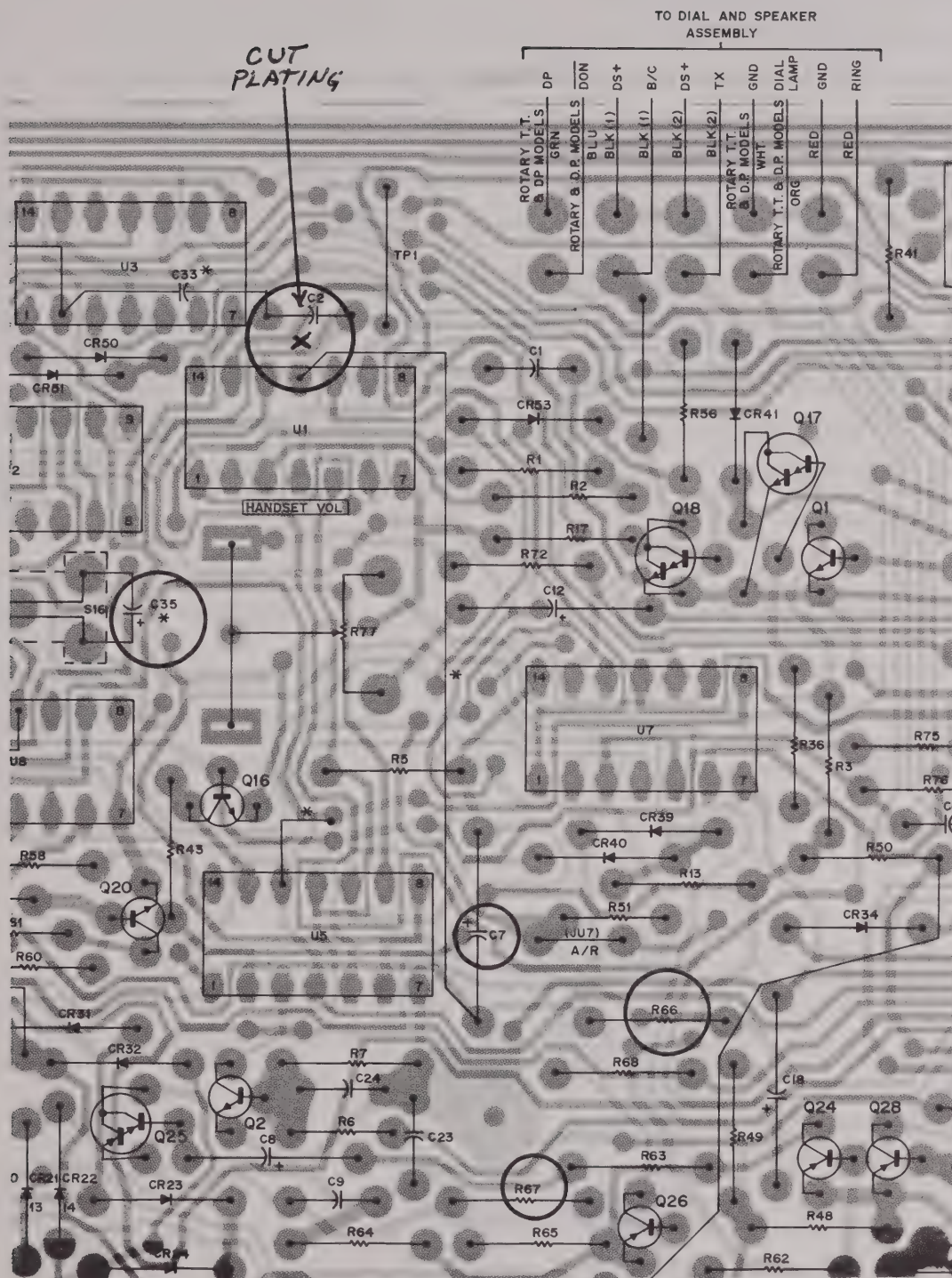


Figure III-1. Cradle Circuit Board Partial Diagrams

NOTE: Refer to "PULSAR 100" Control Head service manual, 68P81037E50-A, or B cradle board and schematic diagram 68P81042E08-B or C.

#### IV. Microphone Audio Muting

Concerns improvements in the general operating characteristics of the control head. All control heads shipped after September 1, 1979 are indicated by the suffix "1" and "2" after the control head model number include the modification and require no further action.

1. The "Transmit Disable Switch", Q4 (Q6 in some early version manuals), on "PULSAR" radio supervisory boards must mute a much lower impedance microphone circuit for "PULSAR 100" and PULSAR II" radios than for earlier model control heads. The proper device must be used for the mute switch or insufficient muting may result. All "PULSAR 100" control head models could be affected.
2. To ensure sufficient "PULSAR 100", or "PULSAR II" microphone audio muting, Q4 on the radio supervisory board must be a type M9648. Early versions of the supervisory boards used a type M9642 transistor, which should be replaced with a type M9648. Refer to Figure IV-1 for location details.

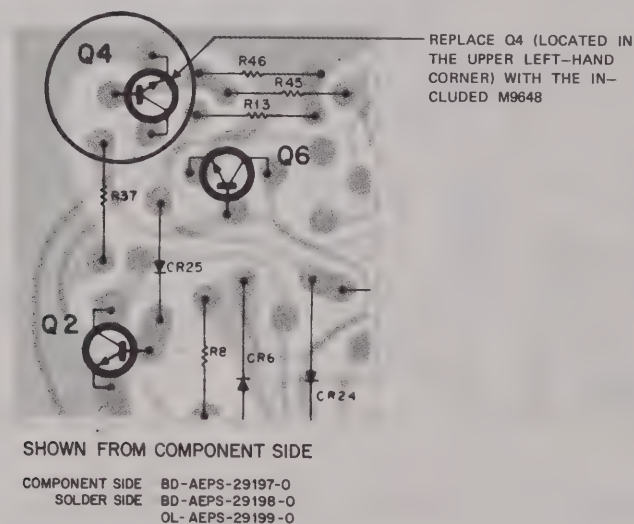


Figure IV-1. Q4 Location on TLN5252 and TLN5254 Supervisory Boards



## V. Proper Connection of Auxiliary Relay Coil

This section concerns improvement in operation of the control head.

1. Connecting the Auxiliary Relay Coil directly to the battery will result in the Auxiliary Alarm being activated continuously if the Cable Kit 3 amp fuse blows open. The A+ side of the auxiliary Relay Coil should be spliced into the Cable Kit 3 amp power line on the radio side of the 3 amp fuse.
2. "PULSAR 100" service manuals, 68P81037E50 issues O, A, and B, have a diagram in the Installation section on page 9 that incorrectly shows interconnecting the Auxiliary Relay Coil. Issue C service manual shows the correct interconnect scheme.
3. Figure V-1 exhibits a corrected "Interconnect Diagram".

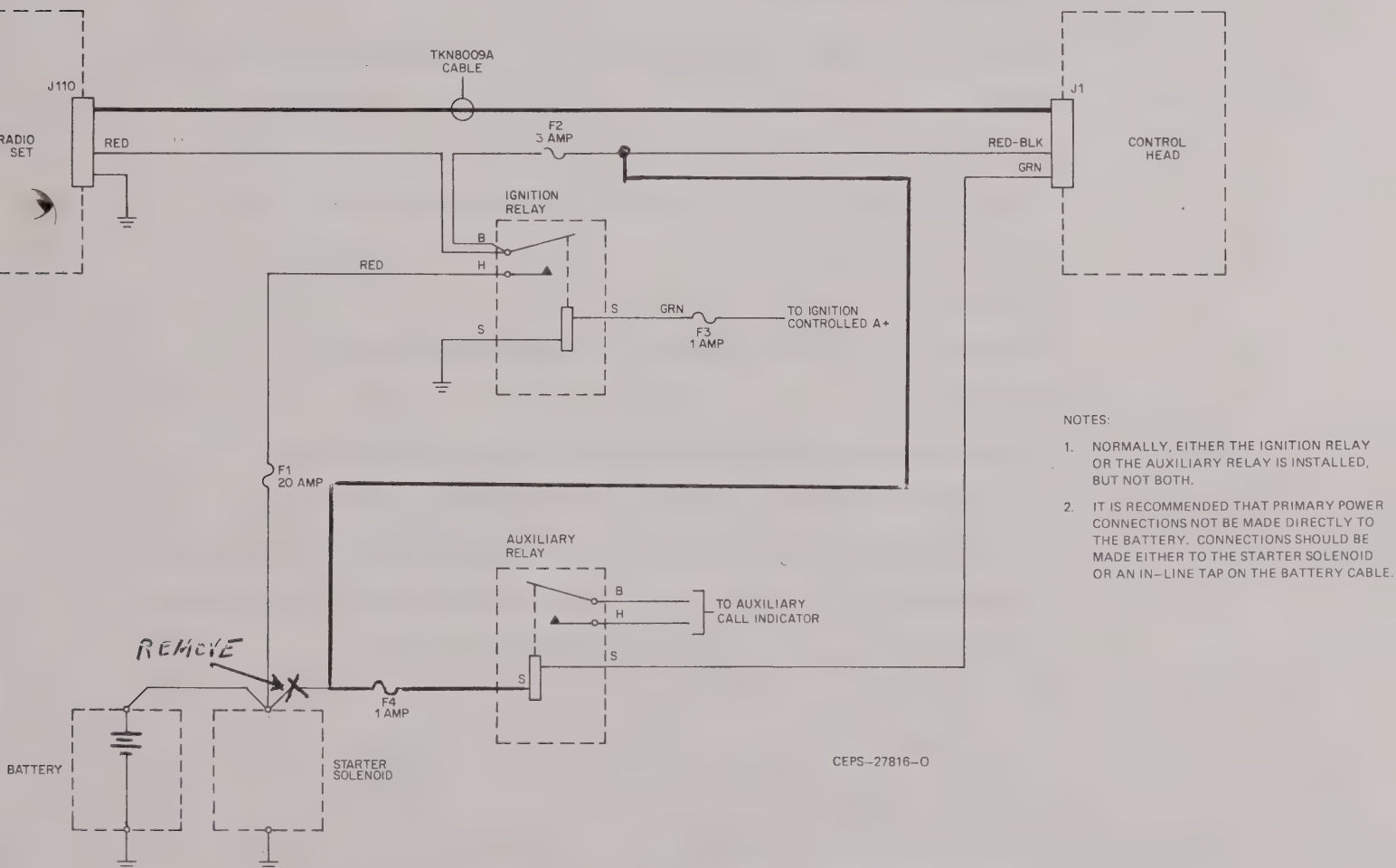


Figure V-1. Interconnect Diagram



## VI. Audio Feedback on "PULSAR 100" Control Heads

Field reports have indicated that some "PULSAR 100" Control Heads are susceptible to audio feedback between speaker and mike in the handset. The cause of the problem has been traced to the black grommet that surrounds the mike. This problem has been eliminated by replacing the black mike grommet with the new grommet part number 05-83044M01. This new grommet (Figure VI-2) is longer and has a smaller O.D. than the original grommet (Figure VI-1).

NOTE: The white color grommet does not exhibit the audio feedback problem.

Control heads shipped after September 15, 1979 incorporate this change.

For control heads shipped prior to September 15, 1979, the new grommet can be installed as follows:

1. Remove the phone number directory label and plastic directory shield.
2. Loosen the exposed captive screw.
3. Insert a wide blade screwdriver into the pry tabs on coil cord end of housing and carefully separate the two halves of the housing.
4. Carefully separate the microphone preamplifier board and the housing.
5. Remove the old grommet and install the new grommet. The grommet stretches around the microphone cartridge.
6. To reassemble the handset, reverse the procedures described for disassembly. Check that the flange portion of the strain relief fits snugly against the housing.

The new grommet part number 05-83044M01 is available at no charge from your local part depot until April 31, 1981 by referencing to this bulletin.

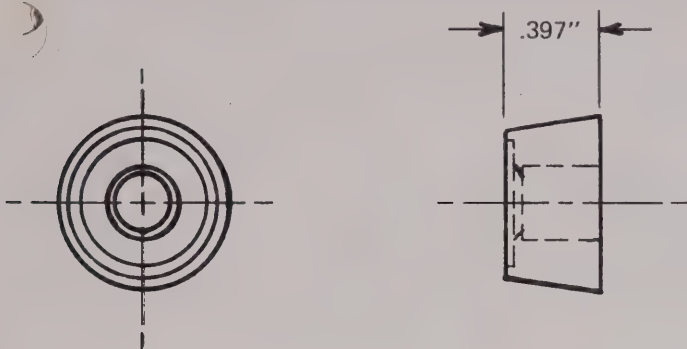


Figure VI-1. Old Mike Grommet

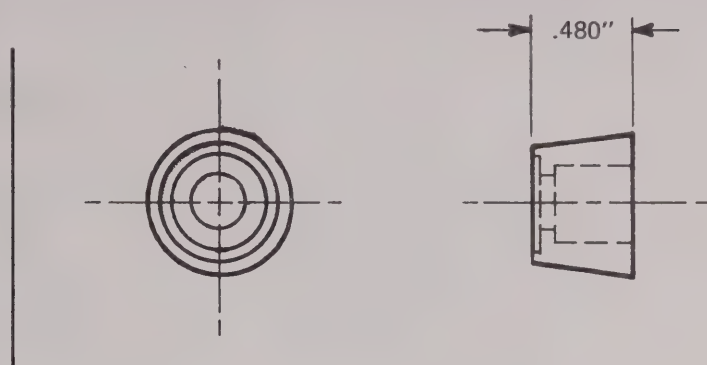


Figure VI-2. New Mike Grommet

#### VII. Damage of Connector Housing

The connector area on the "PULSAR 100" bottom housing was strengthened to prevent damage. Due to this change the old connector part number 15-82547M01 does not mate with the new bottom housing part number 15-84518L02. New connectors can be used with old as well as new bottom housings.

For control heads shipped prior to September 1, 1979 the new bottom housing and connector can be installed as follows:

1. Remove old bottom housing part number 15-84518L01 and replace with new bottom housing part number 15-84518L02.
2. Unscrew the 2 screws on the connector housing and separate the connector cover from the housing and cable.
3. Slide the connector back through the connector housing separating the two parts.
4. With the contact removal tool (66-84690C01) disconnect the red and green wires from positions 3 and 5.
5. Slide these 2 wires through the connector housing.
6. To reassemble the connector, reverse the assembly steps starting with sliding the red and green wires through the 2 square holes in the connector housing and plugging them into holes 3 and 5 respectively.

The new connector housing part number 15-82547M02, is available at no charge from your local parts depot until May, 1981 by referencing this bulletin.

MOTOROLA PART NO.	PARTS REQUIRED DESCRIPTION	*USER PRICE
48-869648	TRANSISTOR, M9648	\$1.19 ea
5-83044M01	GROMMET	\$0.95 PK/5
15-84518L02	HOUSING, connector (bottom)	\$3.75 ea
15-82547M02	HOUSING	\$0.55 ea



# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

ROUTING

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SRN - 890

May, 1980

APC 213

Deadline Date: April 30, 1981

### "PULSAR 100" CONTROL HEAD IMPROVEMENTS AND FUNCTIONS

#### MODELS AFFECTED:

Telco and Bell Models	Control Heads
T1727A, B VHF Bell T1728A, B VHF Telco T1726AA, BA, AC, BC; VHF Bell, Telco Conversion Kit T1737A, B UHF Bell T1738A, B UHF Telco T1726AB, BB, AD, BD; UHF Bell, Telco Conversion Kit ZZ0601A, B VHF Telco Spare ZZ0603A, B UHF Telco Spare	TCN1313A VHF Bell TCN1297A VHF Telco TCN1315A VHF Bell Non-manual TCN1318A VHF Telco Non-manual TCN1312A UHF Bell TCN1298A UHF Telco TCN1316A UHF Bell Non-manual TCN1319A UHF Telco Non-manual TCN1314A Automatic Bell TCN1295A Automatic Telco
RCC Models	Control Heads
T1729A, B VHF RCC T1739A, B UHF RCC T1726AE, BE, AF, BF; VHF, UHF Conversion Kit ZZ0602A, B VHF, RCC Spare ZZ0604A, B UHF, RCC Spare	TCN1296A VHF, RCC TCN1299A UHF, RCC TCN1317A VHF, RCC Non-manual TCN1320A UHF, RCC Non-manual

(OVER)

5/21/80

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.



Modifications have been made to improve the operating performance of the "PULSAR 100" Control Head by preventing improper operation especially when used in an unauthorized manner.

The pertinent items are categorized as follows:

- I. Transmit on Incorrect Channel
- II. Bootleg Disconnect
- III. Mechanical Hookswitch Bounce
- IV. Microphone Audio Muting
- V. Proper Connection of Auxiliary Relay Coil
- VI. Audio Feedback
- VII. Connector Housing

Notes:

1. Caution and special care should be exercised when making modifications due to the presence of CMOS devices in control head circuitry. The use of a ground strap is required to prevent possible damage to these devices.
2. Parts will be supplied by your local area parts depot free of charge until 4/30/81. When ordering parts, reference this bulletin and include the model number and the factory order number of the "PULSAR 100" Control Head.
3. Circuit modifications of the preventive items, I and II, should be made as conditions warrant. The improvement items III, IV, V, VI and VII can be implemented as control heads are returned for routine maintenance, or per customer complaint request.
4. Since this is a service aid bulletin, no warranty labor costs will be accepted.

I. Transmit on Incorrect Channel

This section requires careful attention since the user who resorts to unauthorized use of his control head may inadvertently transmit on

non-allocated channels.

Channel Scan Modification To Prevent Inadvertant Transmitter Key-Up  
On A Wrong Channel When No Channels Are Accessed.

1. Early version "PULSAR 100" Control Head (all models) shipped prior to September, 1979 may have the following problem with old style VHF radios in the following non-authorized manner. In the manual mode with no channels accessed (no buttons down), depressing the push-to-talk button will inhibit an old-style VHF synthesizer on any one of the 16 channels addressed by the control head and allow the transmitter to key-up. Some of these channels will be out of the allocated number of channels of the particular system.

To prevent transmitting on non-allocated channels, the channel reset diodes and reset circuitry must be present, and in the proper configuration on the control head TRN8336A and TRN8624A Cradle Circuit Boards. Positions for the proper parts are available on the boards. Control heads presently used with old style VHF radios must be modified to include these parts, if they are not already present.

2. Approximately 250 control heads including all models were shipped with improper channel reset circuitry starting with the first shipments.

The proper reset circuitry was initiated into production after September, 1979. All heads shipped after this date contain the proper reset circuitry and can be identified by a suffix "1" or "2" after the model number stamped on the control head.

3. In order to reset properly, IC U10, and resistors R12 and R28 must be in (see Figure I-1), and diodes CR44 through CR48 must

be in according to the following table:

DIODE IN / OUT TABLE

Maximum number of channels in system	CR44 "A"	CR45 "B"	CR46 "C"	CR47 "D"	CR48 "E"
7 (VHF RCC)	IN	IN	IN	OUT	OUT
11 (VHF TELCO)	IN	IN	OUT	IN	OUT

Jumper, JU5, if present, must be removed before installation of U10. The modifications are made by referring to both the "PULSAR 100" cradle board schematic and the cradle board layout diagram located in service manual 68P81037E50.

NOTE: The anode of diode CR44 has been erroneously left unconnected by circuit board metallization; the anode must be connected as shown on the cradle board schematic by either using an extra diode lead length or by a short jumper wire.

4. The parts needed for modification are:

REFER. NUMBER	MOTOROLA PART NO.	DESCRIPTION	*USER PRICE
CR44 thru 48	48-83654H01	DIODE, silicon	\$0.43 ea
U10	51-82884L10	INTEGRATED CIRCUIT	\$1.32 ea
R12	6-124C87	RESISTOR, 39-10-1/4 W	\$1.29 PK/10
R28	6-124C97	RESISTOR, 100k-10-1/4 W	\$1.29 PK/10



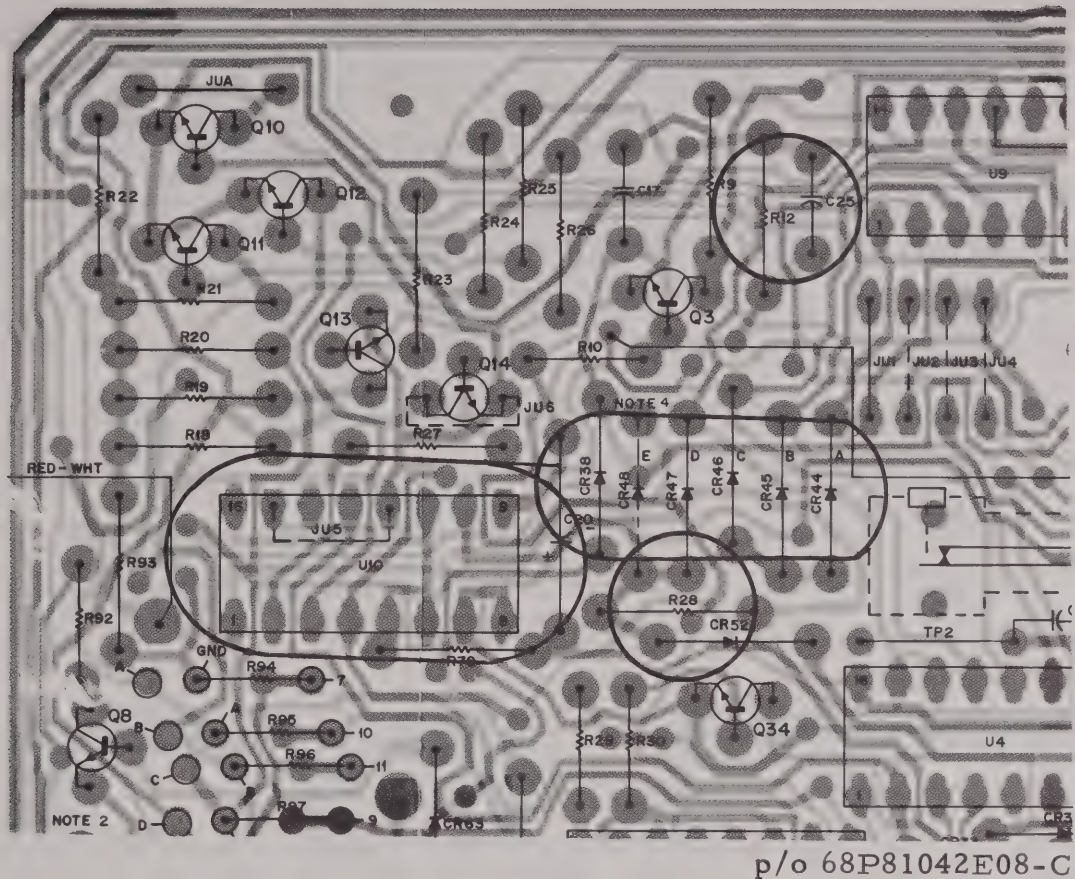


Figure I-1. Cradle Circuit Board Partial Diagram

NOTE: Refer to "PULSAR 100" Control Head service manual, 68P81037E50-A or B, cradle board and schematic diagram 68P81042E08-B or C.

## II. Bootleg Disconnect

The modification recommended in this section prevents disconnect of another user when operating the "PULSAR 100" in an unauthorized manner.

1. A Telco or Bell Control Head can switch to the first channel from any other channel while transmitting in the automatic mode if the mode switch is moved from Roam to Home. After the switch is made the transmitter will remain keyed, and upon hanging up, disconnect will be transmitted on the first channel.
2. All Telco and Bell Model Control Heads are affected (refer to



page 1 for model numbers). Control heads manufactured after September 1, 1979 and are identified with a suffix "1" or "2" after the control head model number have been factory modified to prevent the problem. The modification to prevent "bootleg disconnect" should be made on units as they are returned for normal service maintenance.

3. To prevent the problem, a silicon diode (part number 48-83654H01) must be added to the cradle board. The diode should be added to the solder side, anode to U10 pin 9, and cathode to U3 pin 12; refer to Figure II-1 for the recommended location. Sleeving should be added to the exposed diode leads.

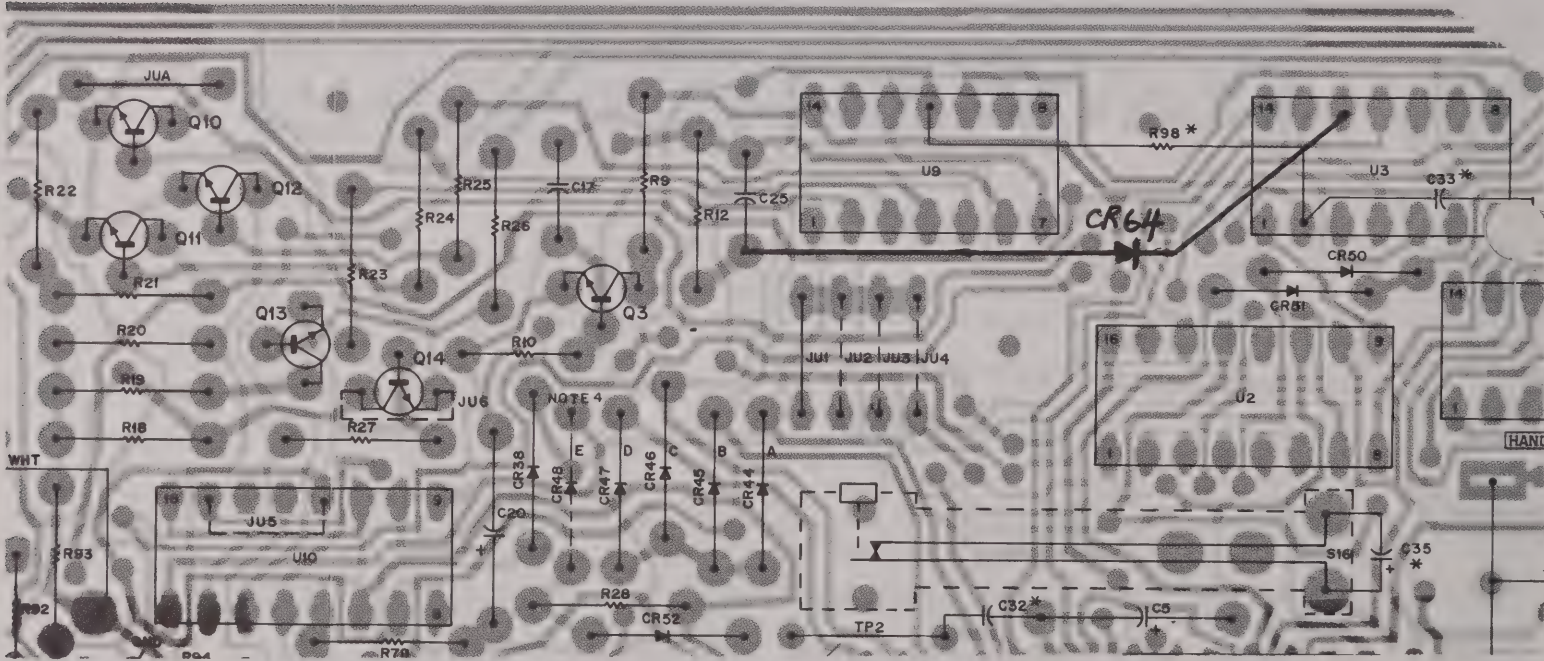


Figure II-1. Cradle Circuit Board Partial Diagram

NOTE: Refer to "PULSAR 100" Control Head service manual 68P81037E50-A or B, cradle board and schematic diagram 68P81042E08-B or C.

### III. Mechanical Hookswitch Bounce

This section covers improvements in the general operating characteristics of "PULSAR 100" Control Head.

1. Excessive mechanical hookswitch bounce can sometimes occur when the "PULSAR 100" Control head is subjected to severe shock or vibration. If the handset is removed from the cradle, as in making a phone call, the leaf switch (hookswitch) contacts could momentarily open, causing an RCC control head to unlatch the transmitter (in the manual mode) or cause the control head to re-key itself during reverive operation. Under conditions of extreme vibration an RCC or Telco Control Head may experience audio breakup due to the hookswitch muting and unmuting the audio path. From initial production, the hookswitch leaves have been adjusted to minimize these effects and are tested for proper performance. However, additional circuitry can be added to the cradle board to effectively "filter" out intermittent switch "opens" during shock or vibration.
2. All "PULSAR 100" Control heads requiring improved hookswitch bounce "filtering" can be modified in the same manner. Only those control heads exhibiting the above problems should be modified.

All RCC Control Heads manufactured after September 1, 1979 that have a suffix "1" or "2" and all Telco Control Heads manufactured after May 15, 1980 have suffix "4" after the model number stamped on the head have been factory modified and should not exhibit the problem.

3. The modification is as follows. Refer to Figure III-1 for the recommended part placement positions and PC board runner cut. On both RCC and Telco and Bell Control Heads, add R66 and C7; refer to Figure III-1 for location. Do not solder C7 in yet as a

jumper wire will also be added later.

On RCC Control Heads, add C35, a 22 uF capacitor, across the leaf switch (hookswitch), S16, on the solder side of the cradle board. Refer to Figure III-1 for proper polarity, making sure that the positive lead of the capacitor is attached to the S16 switch lead closest to the channel switches. Also, make sure that C35 does not block the access hole to volume pot R77.

On all control heads, Telco, Bell, and RCC, the following additional circuitry change must be made. Cut the circuit board metalization runner on the component side leading from U1 pin 11, as shown in Figure III-1. Add an insulated jumper wire (eg., #24AWG, stranded) from U1 pin 11 to the negative end of C7, and complete the soldering of C7. The PC runner must be cut on the component side; the jumper can be added to the solder side.

#### 4. Modification Parts List

REFER. NUMBER	MOTOROLA PART NO.	DESCRIPTION	*USER PRICE
C35	23-82397D54	22 uF, $\pm 20\%$ , 20 V	\$0.85 ea
R66	6-00124C65	4.7k, 10% 1/4 W	\$1.29 PK/10
C7	23-84762H05	4.7 uF, $\pm 20\%$ , 25 V	\$0.66 ea



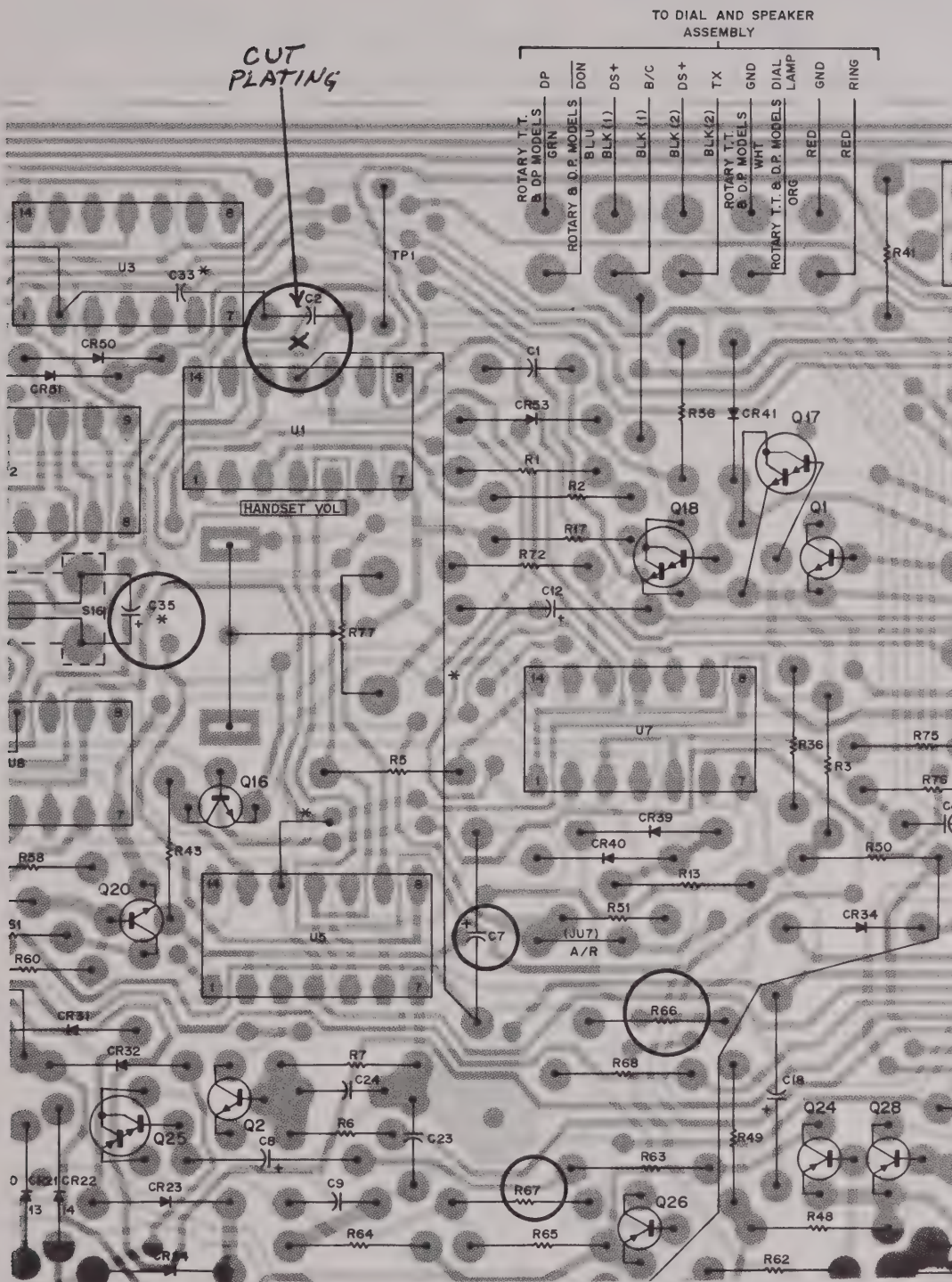


Figure III-1. Cradle Circuit Board Partial Diagrams

NOTE: Refer to "PULSAR 100" Control Head service manual, 68P81037E50-A, or B cradle board and schematic diagram 68P81042E08-B or C.



#### IV. Microphone Audio Muting

Concerns improvements in the general operating characteristics of the control head. All control heads shipped after September 1, 1979 are indicated by the suffix "1" and "2" after the control head model number include the modification and require no further action.

1. The "Transmit Disable Switch", Q4 (Q6 in some early version manuals), on "PULSAR" radio supervisory boards must mute a much lower impedance microphone circuit for "PULSAR 100" and PULSAR II" radios than for earlier model control heads. The proper device must be used for the mute switch or insufficient muting may result. All "PULSAR 100" control head models could be affected.
2. To ensure sufficient "PULSAR 100", or "PULSAR II" microphone audio muting, Q4 on the radio supervisory board must be a type M9648. Early versions of the supervisory boards used a type M9642 transistor, which should be replaced with a type M9648. Refer to Figure IV-1 for location details.

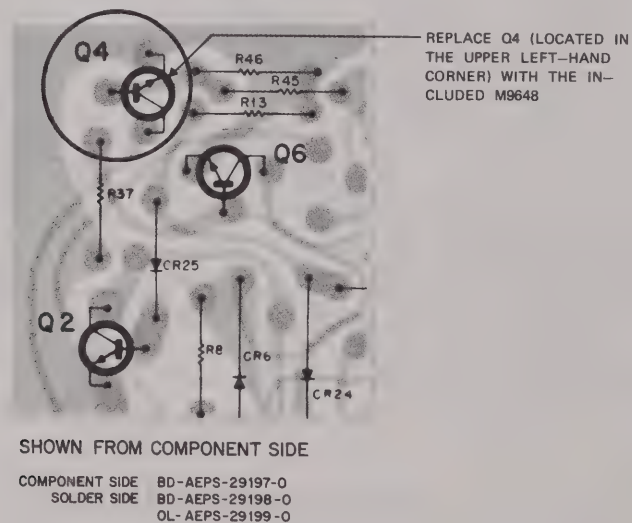


Figure IV-1. Q4 Location on TLN5252 and TLN5254 Supervisory Boards

## V. Proper Connection of Auxiliary Relay Coil

This section concerns improvement in operation of the control head.

1. Connecting the Auxiliary Relay Coil directly to the battery will result in the Auxiliary Alarm being activated continuously if the Cable Kit 3 amp fuse blows open. The A+ side of the auxiliary Relay Coil should be spliced into the Cable Kit 3 amp power line on the radio side of the 3 amp fuse.
2. "PULSAR 100" service manuals, 68P81037E50 issues O, A, and B, have a diagram in the Installation section on page 9 that incorrectly shows interconnecting the Auxiliary Relay Coil. Issue C service manual shows the correct interconnect scheme.
3. Figure V-1 exhibits a corrected "Interconnect Diagram".

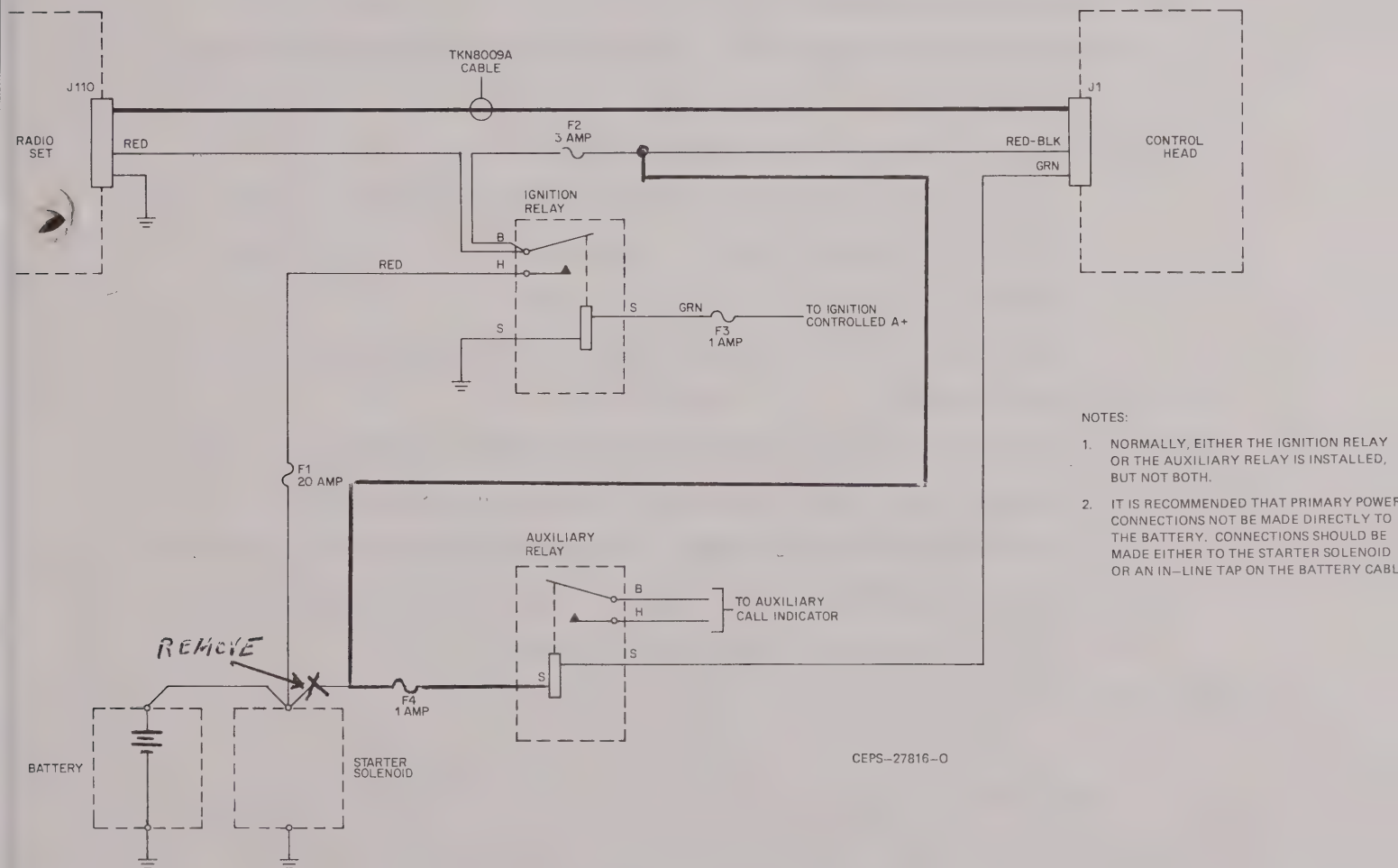


Figure V-1. Interconnect Diagram

## VI. Audio Feedback on "PULSAR 100" Control Heads

Field reports have indicated that some "PULSAR 100" Control Heads are susceptible to audio feedback between speaker and mike in the handset. The cause of the problem has been traced to the black grommet that surrounds the mike. This problem has been eliminated by replacing the black mike grommet with the new grommet part number 05-83044M01. This new grommet (Figure VI-2) is longer and has a smaller O.D. than the original grommet (Figure VI-1).

NOTE: The white color grommet does not exhibit the audio feedback problem.

Control heads shipped after September 15, 1979 incorporate this change.

For control heads shipped prior to September 15, 1979, the new grommet can be installed as follows:

1. Remove the phone number directory label and plastic directory shield.
2. Loosen the exposed captive screw.
3. Insert a wide blade screwdriver into the pry tabs on coil cord end of housing and carefully separate the two halves of the housing.
4. Carefully separate the microphone preamplifier board and the housing.
5. Remove the old grommet and install the new grommet. The grommet stretches around the microphone cartridge.
6. To reassemble the handset, reverse the procedures described for disassembly. Check that the flange portion of the strain relief fits snugly against the housing.

The new grommet part number 05-83044M01 is available at no charge from your local part depot until April 31, 1981 by referencing to this bulletin.

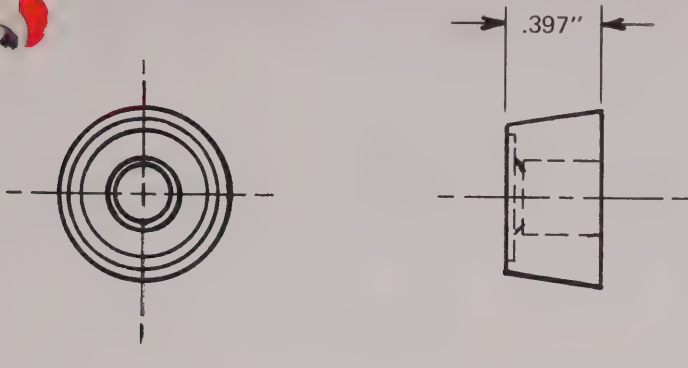


Figure VI-1. Old Mike Grommet

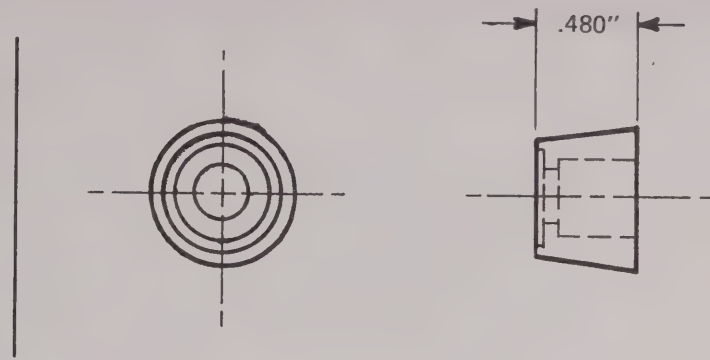


Figure VI-2. New Mike Grommet

#### VII. Damage of Connector Housing

The connector area on the "PULSAR 100" bottom housing was strengthened to prevent damage. Due to this change the old connector part number 15-82547M01 does not mate with the new bottom housing part number 15-84518L02. New connectors can be used with old as well as new bottom housings.

For control heads shipped prior to September 1, 1979 the new bottom housing and connector can be installed as follows:

1. Remove old bottom housing part number 15-84518L01 and replace with new bottom housing part number 15-84518L02.
2. Unscrew the 2 screws on the connector housing and separate the connector cover from the housing and cable.
3. Slide the connector back through the connector housing separating the two parts.
4. With the contact removal tool (66-84690C01) disconnect the red and green wires from positions 3 and 5.
5. Slide these 2 wires through the connector housing.
6. To reassemble the connector, reverse the assembly steps starting with sliding the red and green wires through the 2 square holes in the connector housing and plugging them into holes 3 and 5 respectively.



The new connector housing part number 15-82547M02, is available at no charge from your local parts depot until May, 1981 by referencing this bulletin.

MOTOROLA PART NO.	PARTS REQUIRED DESCRIPTION	*USER PRICE
48-869648	TRANSISTOR, M9648	\$1.19 ea
5-83044M01	GROMMET	\$0.95 PK/5
15-84518L02	HOUSING, connector (bottom)	\$3.75 ea
15-82547M02	HOUSING	\$0.55 ea



# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

ROUTING

SRN - 890A\*\*

December, 1980

APC 213

Deadline Date: 9/30/81

### REVISION PAGES FOR SRN-890

### "PULSAR 100" CONTROL HEAD IMPROVEMENTS AND FUNCTIONS

#### MODELS AFFECTED:

Telco and Bell Models	Control Heads
T1727A, B VHF Bell T1728A, B VHF Telco T1726AA, BA, AC, BC; VHF Bell, Telco Conversion Kit T1737A, B UHF Bell T1738A, B UHF Telco T1726AB, BB, AD, BD; UHF Bell, Telco Conversion Kit ZZ0601A, B VHF Telco Spare ZZ0603A, B UHF Telco Spare	TCN1313A VHF Bell TCN1297A VHF Telco TCN1315A VHF Bell Non-manual TCN1318A VHF Telco Non-manual TCN1312A UHF Bell TCN1298A UHF Telco TCN1316A UHF Bell Non-manual TCN1319A UHF Telco Non-manual TCN1314A Automatic Bell TCN1295A Automatic Telco
RCC Models	Control Heads
T1729A, B VHF RCC T1739A, B UHF RCC T1726AE, BE, AF, BF; VHF, UHF Conversion Kit ZZ0602A, B VHF, RCC Spare ZZ0604A, B UHF, RCC Spare	TCN1296A VHF, RCC TCN1299A UHF, RCC TCN1317A VHF, RCC Non-manual TCN1320A UHF, RCC Non-manual

\*\*Replace pages 1, 2, 13 and 14 of SRN-890 with these revised pages.

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

Modifications have been made to improve the operating performance of the "PULSAR 100" Control Head by preventing improper operation especially when used in an unauthorized manner.

The pertinent items are categorized as follows:

- I. Transmit on Incorrect Channel
- II. Bootleg Disconnect
- III. Mechanical Hookswitch Bounce
- IV. Microphone Audio Muting
- V. Proper Connection of Auxiliary Relay Coil
- VI. Audio Feedback
- VII. Connector|Housing

Notes:

- 1. Caution and special care should be exercised when making modifications due to the presence of CMOS devices in control head circuitry. The use of a ground strap is required to prevent possible damage to these devices.
- 2. Parts will be supplied by your local area parts depot free of charge until 9/30/81. When ordering parts, reference this bulletin and include the model number and the factory order number of the "PULSAR 100" Control Head.
- 3. Circuit modifications of the preventive items, I and II, should be made as conditions warrant. The improvement items III, IV, V, VI and VII can be implemented as control heads are returned for routine maintenance, or per customer complaint request.
- 4. Since this is a service aid bulletin, no warranty labor costs will be accepted.

I. Transmit on Incorrect Channel

This section requires careful attention since the user who resorts to unauthorized use of his control head may inadvertently transmit on

The new grommet part number 05-83044M01 is available at no charge from your local part depot until September 30, 1981 by referencing to this bulletin.

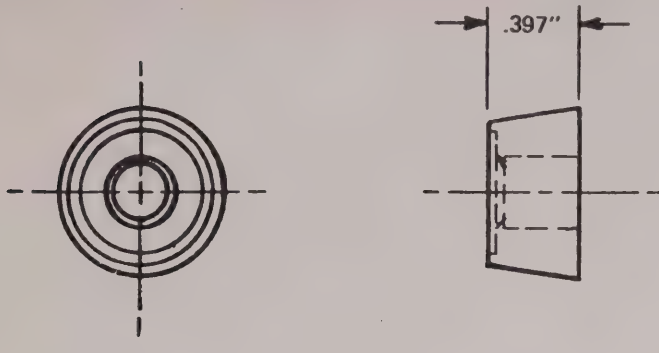


Figure VI-1. Old Mike Grommet

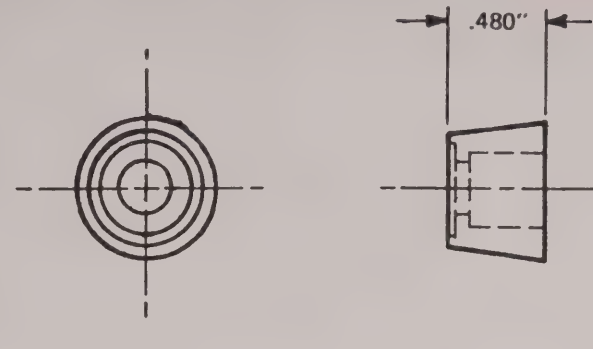


Figure VI-2. New Mike Grommet

#### VII. Damage of Connector Housing

The connector area on the "PULSAR 100" bottom housing was strengthened to prevent damage. Due to this change the old connector part number 15-82547M01 does not mate with the new bottom housing part number 15-84518L02. New connectors can be used with old as well as new bottom housings.

For control heads shipped prior to September 1, 1979 the new bottom housing and connector can be installed as follows:

1. Remove old bottom housing part number 15-84518L01 and replace with new bottom housing part number 15-84518L02.
2. Unscrew the 2 screws on the connector housing and separate the connector cover from the housing and cable.
3. Slide the connector back through the connector housing separating the two parts.
4. With the contact removal tool (66-84690C01) disconnect the red and green wires from positions 3 and 5.
5. Slide these 2 wires through the connector housing.
6. To reassemble the connector, reverse the assembly steps starting with sliding the red and green wires through the 2 square holes in the connector housing and plugging them into holes 3 and 5 respectively.



The new connector housing part number 15-82547M02, and the cradle bottom housing part number 15-84518L02 are available at no charge from your local parts depot until September, 1981 by referencing this bulletin.

MOTOROLA PART NO.	PARTS REQUIRED DESCRIPTION	*USER PRICE
48-869648	TRANSISTOR, M9648	\$1.19 ea
5-83044M01	GROMMET	\$0.95 PK/5
15-84518L02	HOUSING, (cradle bottom)	\$3.75 ea
15-82547M02	HOUSING, connector	\$0.55 ea



# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

MOBILE TELEPHONE SYSTEMS AND PRODUCTS

ROUTING

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SRN-892

April, 1980

APC-213

Deadline Date: N/A

SUBJECT: CONTACTS FOR TECHNICAL ASSISTANCE AND INFORMATION FOR  
MOBILE TELEPHONE SYSTEMS AND PRODUCTS

Inquiries directly to plant for technical assistance and information usually results in loss of time to resolve a customer problem.

Depending upon type of customer and factory order a more direct route is via our Field Engineering Services Organization. Except for special cases, the majority of orders placed for Common Carrier Products emanate from Telephone Companies (Telco's) Radio Common Carrier (RCC's) and PCS/CPE/COAM Sales Team.

Field Engineering Services Contacts are as follows:

<u>Telco's</u>	Area 22	312, 981-7031 - - Di-Tel 741-7031
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<u>RCC's</u>	Area 27	312, 981-7032 - - Di-Tel 741-7032
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<u>PCS/CPE/COAM</u>	Geographic Area Engineering Services
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Note: Refer to body of Factory Order number to determine specific area to contact.

If the equipment was sold by the PCS/CPE/COAM Sales Team, or any other sales group logging their orders through a geographic area office, they should receive their technical support from their respective geographic area Field Engineering and Service Groups. The area salesman placing the order can be contacted for details, eg. name, telephone number, etc.

If the field organization is unable to answer the inquiry, Product Services should be contacted promptly with minimum time lost to customer.

For the expedient repair of "Pulsar"® Mobiles refer to SRN-859 bulletin dated August, 1979.

SRN-892

4/18/80

-1 of 1-

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.





# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-893

April, 1980

APC-213

Deadline Date: N/A

SPECIAL REPAIR SERVICE FOR I-F FILTER MODULE USED  
IN UHF "PULSAR" MOBILES

Radio Model Affected: T1837B, T1383B and T1839B

Module Affected: TLN1802A I-F Filter

A Motorola field service facility will be utilized to provide special repair service for the above module. This facility has been especially trained and equipped for quick repair or replacement of this module.

A replacement unit will be supplied only upon receipt of the defective item.

Out-of-warranty repairs will be made on a time and material basis. When adequate repair history is available, it is anticipated that a flat rate charge will be established.

To obtain this special repair service, return defective unit to:

Motorola C & E, Inc.  
Midwest Service Depot  
2227 Hammond Drive  
Schaumburg, Illinois 60196  
Telephone: (312) 576-5760







# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## ROUTING

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SRN-895

August, 1980

APC-433

Deadline Date: N/A

## TEST EQUIPMENT CONSIDERATIONS FOR "MITREK"/"MOCOM-70" RADIOS

MODELS AFFECTED: TEK-5 Test Bench Meter Panel  
 TEK-42 "Channel-Scan" Tester with TEKA-81 Test Adapter Cable  
 TEK-29 Universal Control Panel  
 S1056A/B Through S1059A/B Portable Test Set

The "Mitrek" and "Mocom-70" radios are compatible from an operational standpoint, but there are significant modifications which must be made to the applicable test equipment as described in the following paragraphs.

## 1. TEK-5 TEST BENCH METER PANEL:

The TEK-5B thru E models should use position A on the rotary switch. If the TEK-5 panel is not modified, M1 and M2 will peg backwards. There are two ways this problem can be resolved:

1. Use RPX-4053A Field Modification Kit.
2. Use TEK-5F or later model that incorporates an M1-M2 reverse switch.

When the TEK-5 Meter Panel is used with an appropriate control head ("Mitrek" or modified "Mocom-70") for MITREK radio measurements, the load-speaker selector switch S1 should be LEFT IN THE MIDDLE POSITION ONLY AT ALL TIME. In the "load" or "speaker" position, a low impedance (3 ohms) is connected across the M7 circuit. M7 circuit connects between U402 pin 4 via a 500 uF capacitor C2 on the V.D. Board and ground. Thus, with S1 in the "load" or "speaker" position, U402 pin 4 is being connected to ground through the low impedance of the load or the speaker. This improper loading will result in erroneous power level readings and higher than actual distortion readings.

CAUTION: In positive ground applications, the case of the TEK-5 meter Panel is hot wired to the vehicle chassis.

## 2. TEK-42 "CHANNEL-SCAN" TESTER WITH TEKA-81 TEST ADAPTER CABLE

The TEK-42 "Channel-Scan" Tester and TEKA-81 Adapter Cable have been reviewed by Engineering for compatibility with "Mitrek System 90" channel scanners. Further, National Parts Department has agreed to make the

-(OVER)-

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Not User Price—Subject to change without notice.

necessary circuit modifications and to issue an updated TEK-42 service manual. This information should be available for shipment by the end of August, 1980.

If this information is needed before the updated manual is available, it can be obtained through Product Services, Ft. Worth, Texas (817-23206242 or Ditel 729-6242).

### 3. TEK-29 UNIVERSAL CONTROL PANEL

- 3.1 In the TEK-27 Junction Box, remove the BLK wire between pins 6 and 11 of J1 (Refer to Figure 1).
- 3.2 Make the following changes in the TEK-25 Universal Control Panel: (refer to Figure 2).
  - 3.2.1 Remove BLK ground wire between pin 11 of TB1 and end terminal of R3A (SQUELCH CONTROL).
  - 3.2.2 Move the R1 (AUDIO PAD) end BLK ground wire connected to the end terminal of R3A from R1 to R4 (MOTRAC VOLUME) where the BLK-RED wires are connected.
  - 3.2.3 Remove the BLK ground wire from the end terminal of R1 coming from S5B (DUAL SQUELCH). Connect it to R4 where the BLK-RED wires are connected.
  - 3.2.4 Remove the BLK ground wire connecting S5B and LS1 (speaker).
  - 3.2.5 Remove the other BLK wire connected to LS1 and connect it to S4 ("EXTENDER") where BLK-RED wires are connected.
  - 3.2.6 Connect a wire between the now empty speaker terminal and the end of R1 closest to TB1, where now only 1 BLK wire and R2 are connected.
  - 3.2.7 Connect a wire between this same terminal of R1 and pin 11 of TB1.

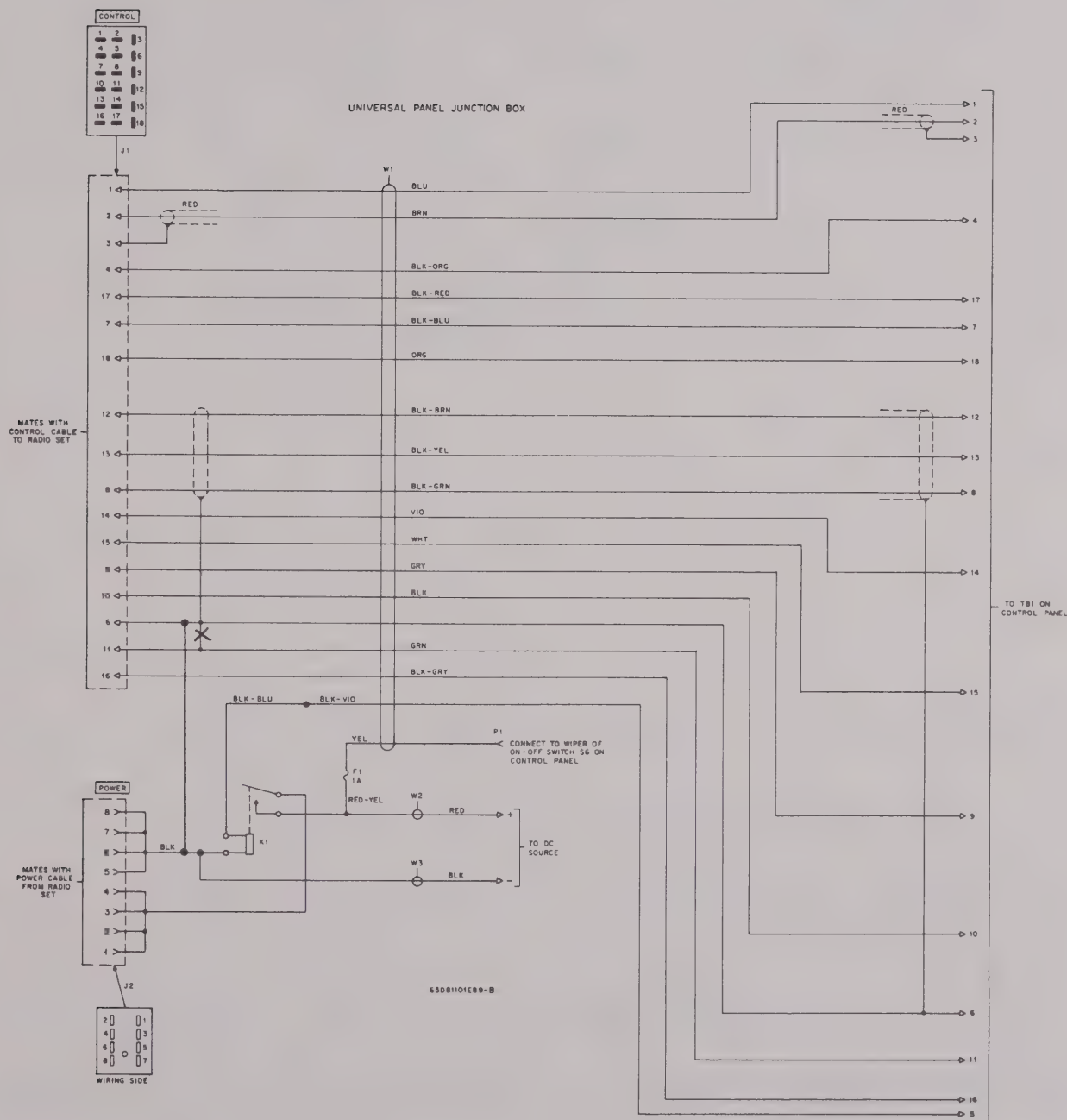


Figure 1. Modified TEK-27 Junction Box



# UNIVERSAL CONTROL PANEL

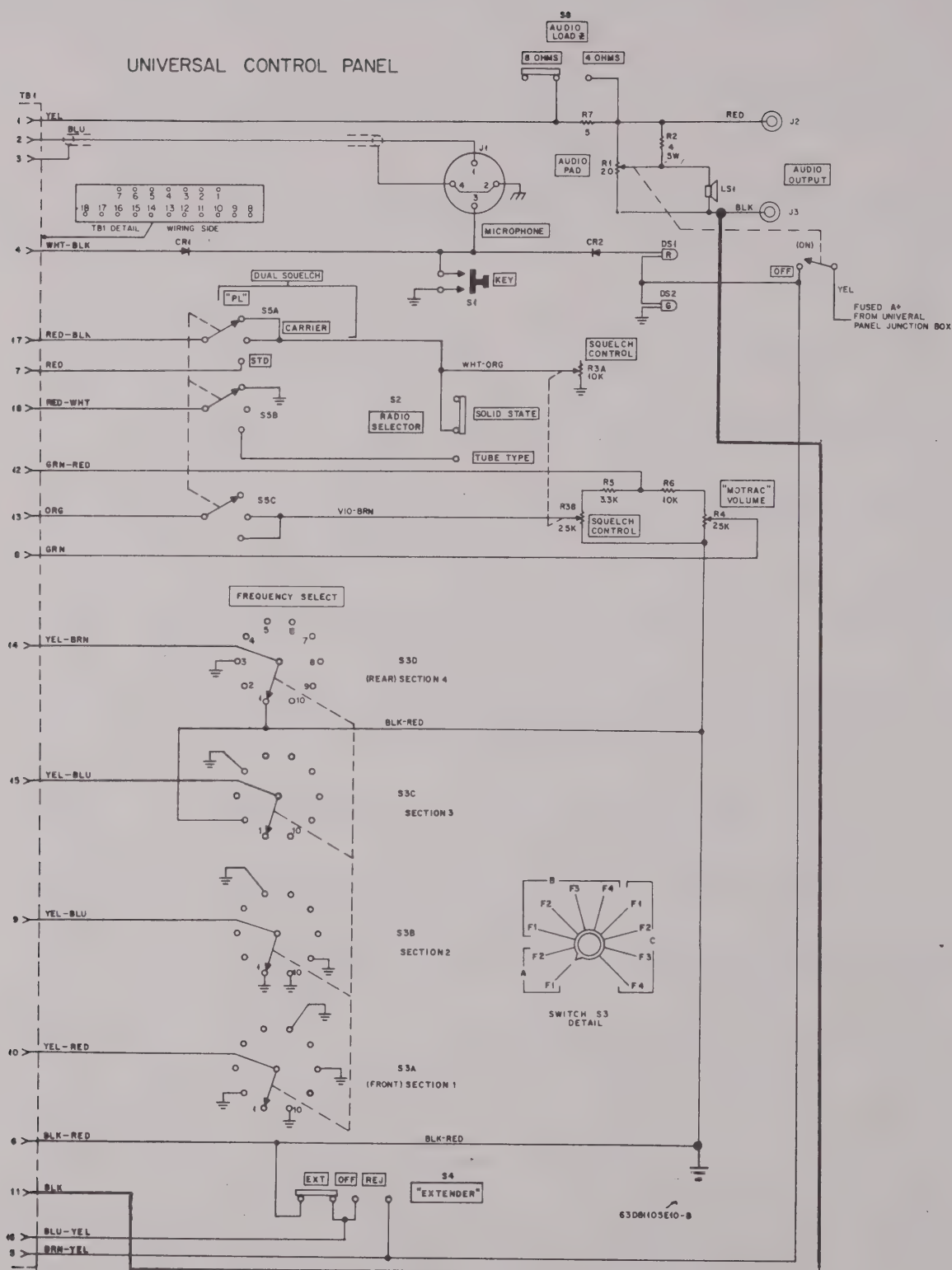


Figure 2. Modified TEK-25 Universal Control Panel

#### 4. S1056A/B THROUGH S1059A/B PORTABLE TEST SET

##### 4.1 PURPOSE

This modification isolates the Portable Test Set panel from the vehicle chassis DC reference. This allows proper "in vehicle" servicing of a positive ground "Mitrek" or "Mocom" radio.

##### 4.2 PROCEDURE FOR THE METER PANEL

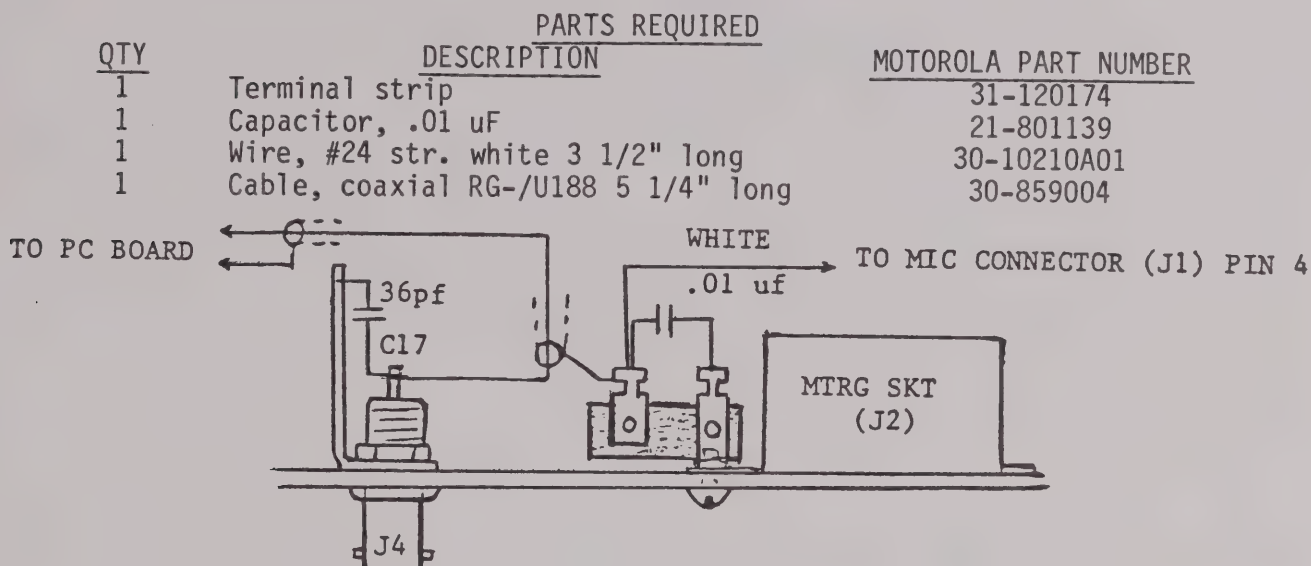


Figure 3. Meter Panel Detail

- 4.2.1 Obtain the following parts and refer to Figure 3.
- 4.2.2 Remove the ground strap from the meter mounting screw and the "Xmtr On" switch (S5).
- 4.2.3 Remove the GRN shielded lead from the P.C. board to the RF BNC connector J4.
- 4.2.4 Solder the .01 uF capacitor to terminal strip, keeping leads as short as possible.
- 4.2.5 Mount the terminal strip with capacitor to meter panel using metering socket J2 mounting screw.
- 4.2.6 Connect a 3 1/2" piece of WHT wire (#24 stranded) from the insulated terminal of the added terminal strip to the "Microphone" socket J1, pin 4.
- 4.2.7 Connect a piece of RF coaxial cable (5 1/4" long) to the P.C. board where the GRN shielded cable was removed.
- 4.2.8 Connect the shield of the coax cable to the insulated terminal of the added strip.
- 4.2.9 Connect the center conductor of the coax cable to the center of the BNC connector J4.

### 4.3 PROCEDURE FOR PEAKING GENERATOR

4.3.1 Obtain the following parts and refer to Figure 4.

PARTS REQUIRED		
QTY	DESCRIPTION	MOTOROLA PART NUMBER
1	Capacitor, .01 uF	21-801139
1	Wire, #24 str. Yellow 1 1/2" long	30-10310C60
1	Wire, #24 str White 2" long	30-10310A01

- 4.3.2 Remove the jumper from L3 to C7.
- 4.3.3 Remove the jumper from C7 to C10.
- 4.3.4 Remove the jumper from R6 to the mounting sscrew solder lug.
- 4.3.5 Move the ORG lead from the mounting screw solder lug to R6 where the jumper was.
- 4.3.6 Add a .01 uF capacitor from the mounting screw solder lug to R6 where the ORG lead is now attached.
- 4.3.7 Move the end of R4 attached L3 to C7.
- 4.3.8 Add a jumper (YEL #24 stranded) from L3 to C10.
- 4.3.9 Add a jumper (WHT #24 stranded) from the junction of R4, C7 and C8 to the mounting screw solder lug.

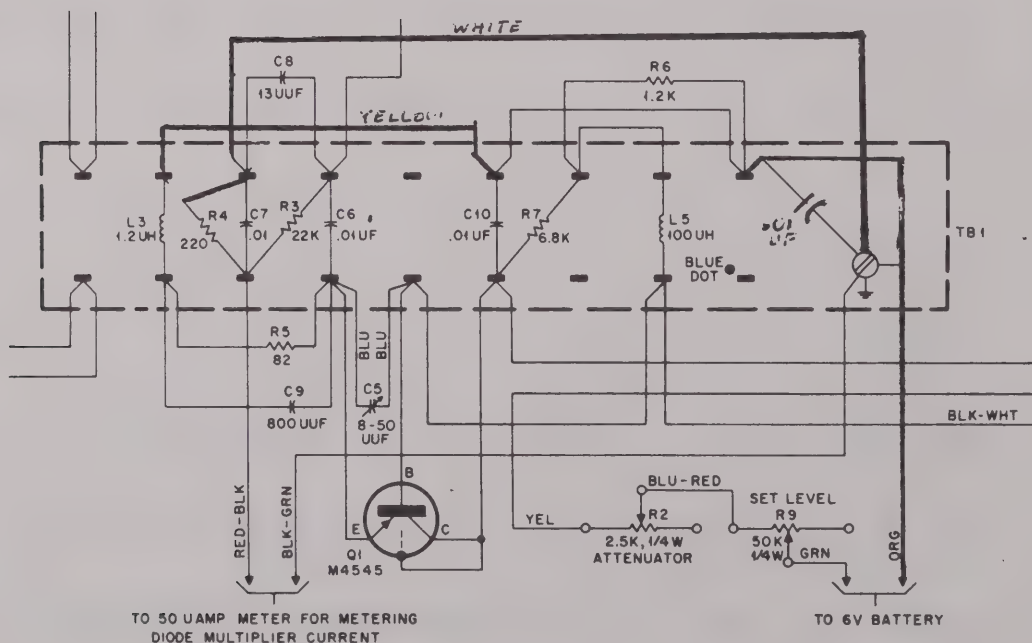


Figure 4. TB1 Diagram After Modification

#### 4.4 PROCEDURE FOR DEVIATION METER

- 4.4.1 Remove the jumper from the positive terminal of the Ext. Pwr. jack J3 to terminal strip (chassis ground).
- 4.4.2 Connect a 1 amp fuse (65-82896B03) in place of the jumper removed above.

PART REQUIRED		
<u>QTY</u>	<u>DESCRIPTION</u>	<u>MOTOROLA PART NUMBER</u>
1	Fuse, 1amp	65-82896B03

#### CAUTION

When operating the deviation meter from the Ext. Pwr. jack, it is necessary that the dc source be floating with reference to vehicle chassis in negative ground vehicles; vehicle battery must not be used.





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# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

SRN-896

May, 1980

APC-227

Deadline Date: N/A

## ELIMINATION OF NOISE, CAUSED BY DC POWER INVERTERS, ON "PULSAR"® FULLY AUTOMATIC CONTROL TERMINAL

MODELS AFFECTED: T1821A thru T1826A and T1917A

It has been noted on occasion that the DC-AC Power Inverters, (TPN6091A) and TPN6092A) inject objectionable noise on the central office battery line. The injected noise can affect other central office equipment and be heard as an audible tone by the central office subscribers.

In general, this problem is noted in smaller central offices and is a result of relatively high impedance in the battery power supply.

The noise can be eliminated by inserting a decentralizing filter between the central office DC power source and the "Pulsar" Terminal. This will eliminate the noise from feeding to other central office equipment via the power system. The decentralizing filter should be installed so that the "Pulsar" Terminal is drawing current through the filter.

An appropriate filter is available from Motorola Communication Parts Department. The filters are mountable in a standard (19) inch rack. Because of space restrictions they must be mounted external to the "Pulsar" Terminal cabinet. Refer to the following table to determine the proper filter to order for each "Pulsar" model.

Pulsar Model	Filter Part No.	Filter Max Current	Filter Panel Height
T1821A T1824A	RD4826074	15 amps	5-1/4"
T1822A T1823A T1825A T1826A	RD4826075	25 amps	5-1/4"
T1917A	RD4826092	50 amps	7"

Since this is a service aid bulletin no charges will be accepted.

SRN-896

4/28/80

-1 of 1-

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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\*Net User Price—Subject to change without notice.





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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-899

July, 1980

APC-213

Deadline Date: 9/30/81

IMPROVED LOCKING OF SWIVEL MOUNTING  
BRACKET ON "PULSAR" MOBILE CONTROL HEADS

Models Affected: "Pulsar II" and "Pulsar 100" Control Heads

Kit Affected: TLN5908A Deluxe (Universal) Mounting Bracket

Certain assemblies of the TLN5908A Deluxe (Universal) Swivel Mounting Bracket may not provide sufficient holding ability when the knob is tightened by hand.

The units affected are those shipped between August, 1979 and April, 1980.

The swivel mount locking ability can be substantially increased by installing the parts listed in the PARTS REQUIRED paragraph.

Modification Instructions - Refer to Figure 1.

1. Detach the mount from the stand and the control head.
2. Remove the knob from the ball assembly. Item 9 on Figure 1.
3. Slip the ball assembly through the frame.
4. Remove the fastening bolt (item 2) from the outer housing assembly and separate the halves.
5. Remove the inner cylinder halves (item 7) and place one (1) neoprene washer (item 5) on the outside of each cylinder half, as shown in Figure 1.
6. Replace each inner cylinder half into its respective outer housing half, (item 4), making sure that the springs (item 6) remain centered in their wells.
7. If the inner cylinder halves have positioning pins (refer to item 7A) place the fibre washer (item 8) between the outer housing halves and fasten the assembly securely with the fastening bolt (item 2) making sure that the fastening bolt runs through the fibre washer.
8. Slip the entire assembly through the mounting frame (item 12).

Note: If the inner cylinder halves do not have positioning pins, the assembly halves must be inserted separately through the frame, then the fibre washer and finally the fastening bolt should be attached.

-(OVER)-

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\*Not User Price—Subject to change without notice.



9. Replace the round rubber spacer (item 10, Pt. No. 43B83106L01) with the thicker rubber spacer (Pt. No. 43B83106L02). This will remove excessive play out of the swivel mounting bracket.
10. Reattach the mounting bracket to the control head and mount the stand and insert the knob.

The parts required are available at no charge until September 30, 1981. Labor not to exceed 1/2 hour by an authorized Motorola Service Center can be charged to warranty using standard warranty procedure. Reference must be made to this bulletin including model and serial numbers of radio for each order.

#### PARTS REQUIRED

<u>Qty.</u>	<u>Motorola Part No.</u>	<u>Description</u>	<u>*User Price</u>
2	4-84293M01	WASHER, neoprene	\$1.20 PK/25
1	4-483357	WASHER, fibre	\$0.28 PK/25
1	43-83106L02	SPACER, rubber	\$1.75 PK/10

- ① FASTENING NUT (2 EA.)
- ② FASTENING BOLT
- ③ LOCK WASHER (2 EA.)
- ④ OUTER HOUSING HALF (2 EA.)
- ⑤ NEOPRENE WASHER P/N 04B84293MO1 (2 EA.)
- ⑥ SPRING (2 EA.)
- ⑦ INNER CYLINDER HALF (2 EA.)
- ⑦A POSITIONING PINS
- ⑧ FIBRE WASHER P/N C4483357
- ⑨ KNOB
- ⑩ ROUND RUBBER SPACER P/N 43B83106L02
- ⑪ MOUNTING PLATE
- ⑫ MOUNTING FRAME
- ⑬ HEX HEAD SCREW (4 EA.)

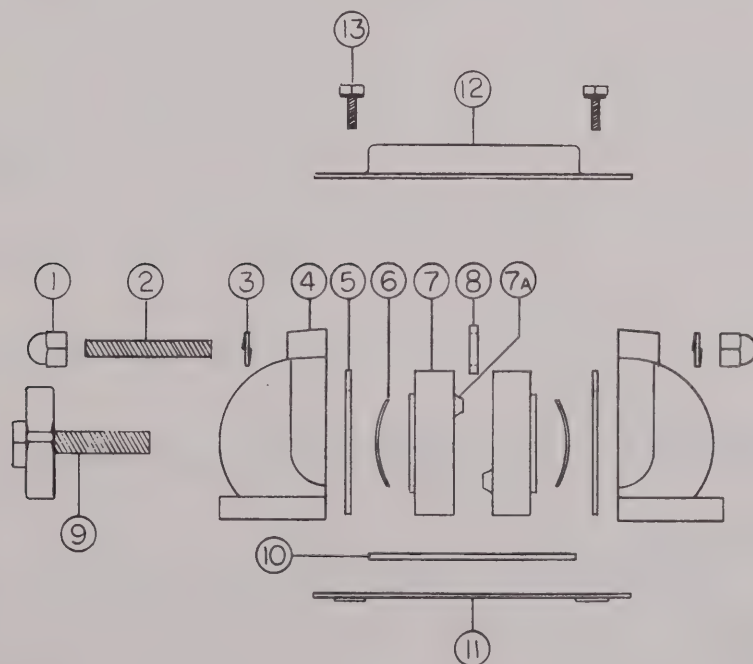


Figure 1.





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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-900

May, 1980

APC-227

Deadline Date: N/A

## "PULSAR" CONTROL TERMINAL IMPROVEMENTS FOR DAS ALARMS AND MULTI-SYSTEM 8-CHANNEL BSI OPERATION

MODELS AFFECTED: T1823A, T1826A, T1917A

### I. DAS Alarms - Activation of Watchdog Timer by Station Busy Interrupt (SBI\*) (Models T1823A and T1826A only.)

The Station Busy Interrupt (SBI\*) is designed to activate the Microprocessor Unit (MPU) Watchdog Timer on the DAS II Control Board. If the DAS II does not respond and release the Station Busy Interrupt within approximately 1.5 seconds, an MPU alarm will be generated. A modification that adds a wire will guard against a DAS II failure with no alarm present.

For the two models listed above, the signal bus SBI\* is not wired to the DAS II Control Board. No problem will be noted in normal operation, however the potential for a DAS II failure with no alarm exists.

The signal bus, SBI\* in the main "Pulsar" Card Case (refer to Cabling Section in manual) consists of J109 - 33 to J114 - 33 to J119 - 33 to J124 - 33 to J015 - 16.

The additional wire connection is made between this signal bus and J101 - MM.

All terminals shipped after April 1, 1980 have the corrected wiring in the Backplane.

### II. Multi-System 8-Channel Base Station Identification (BSI) (Model T1917A only)

A channel interference problem may exist after Base Station Identification (BSI) is made.

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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When a channel transmits its Morse Code base station identification, the Originate Vertical lead of the cross point diode used to connect the Allotter Card to the mobile channel may not turn off. This is due to a current path caused by any one of the eight 10,000-ohm resistors on the TRN8490A Allotter Decoder Board. These resistors are R1 through R6, R15 and R16.

The resultant operation, seen after the BSI terminates, is the channel will return to full power and be marked "idle" in a single channel area module. Any attempts of call activity on this channel will not be successful while the crosspoint diode remains turned on. Once the crosspoint diode turns off, the mobile channel will function normally.

Removing resistors R1 thru R6, R15 and R16 will alleviate the possibility of such a failure. All terminals shipped after April 1, 1980 include this modification.

Refer to Figure 1, PC Board Detail for removal of resistors circled.

Since this is a service aid bulletin, warranty labor is not applicable.

COMPONENT  
SIDE

1
2
3
4
5
6
7
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11
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41
42
43

ALLOTTER 6

ALLOTTER 7

ALLOTTER 8

COMPONENT SIDE EEPS-26602-0  
SOLDER SIDE EEPS-26603-0  
OL EEPS-26604-0

When a channel transmits its Morse Code base station identification, the Originate Vertical lead of the cross point diode used to connect the Allotter Card to the mobile channel may not turn off. This is due to a current path caused by any one of the eight 10,000-ohm resistors on the TRN8490A Allotter Decoder Board. These resistors are R1 through R6, R15 and R16.

The resultant operation, seen after the BSI terminates, is the channel will return to full power and be marked "idle" in a single channel area module. Any attempts of call activity on this channel will not be successful while the crosspoint diode remains turned on. Once the crosspoint diode turns off, the mobile channel will function normally.

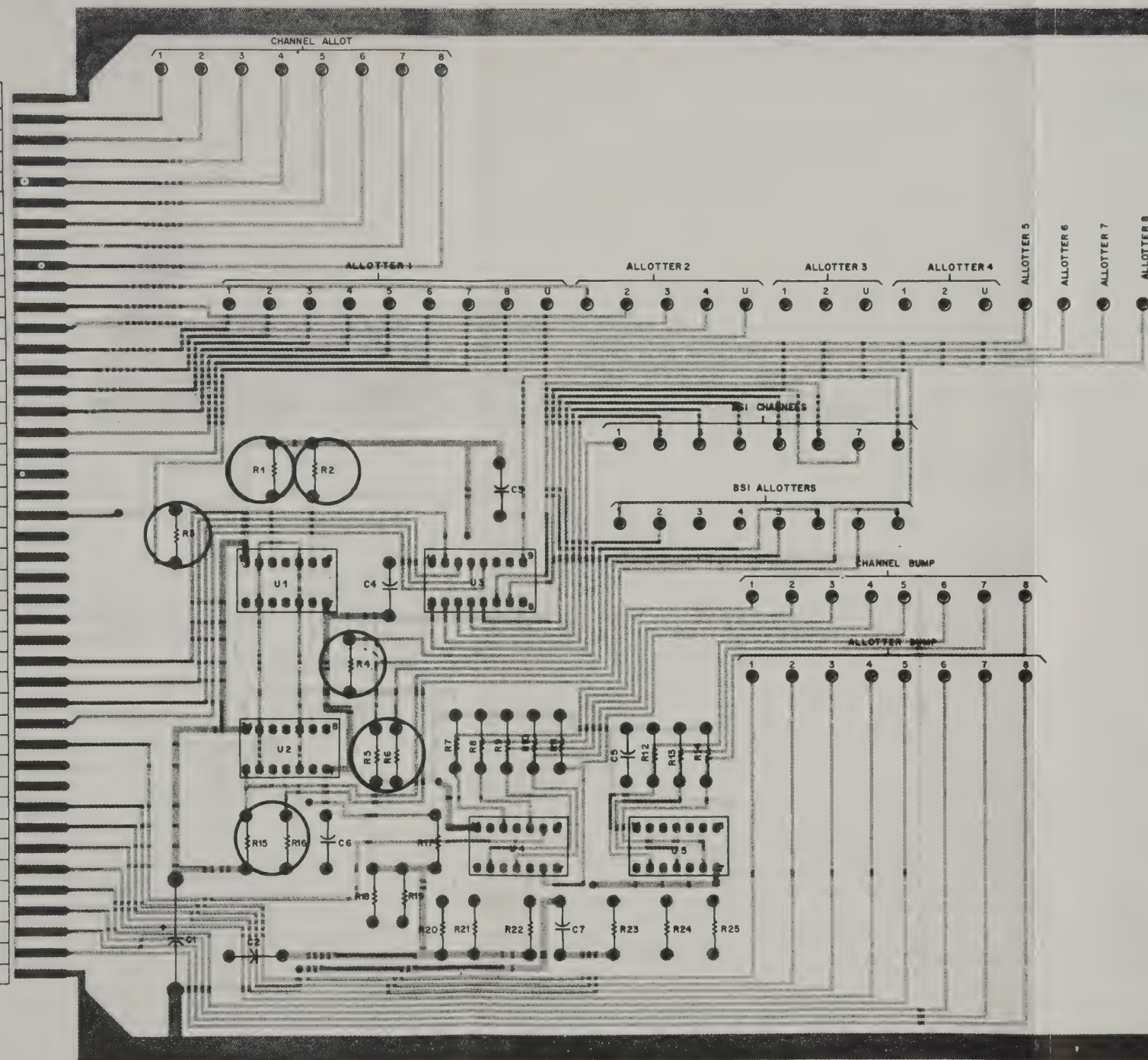
Removing resistors R1 thru R6, R15 and R16 will alleviate the possibility of such a failure. All terminals shipped after April 1, 1980 include this modification.

Refer to Figure 1, PC Board Detail for removal of resistors circled.

Since this is a service aid bulletin, warranty labor is not applicable.



COMPONENT SIDE	SOLDER SIDE
1	A
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L
11	M
12	N
13	P
14	R
15	S
16	T
17	U
18	V
19	W
20	X
21	Y
22	Z
23	AA
24	BB
25	CC
26	DD
27	EE
28	FF
29	HH
30	JJ
31	KK
32	MM
33	NN
34	PP
35	QQ
36	RR
37	SS
38	TT
39	UU
40	VV
41	WW
42	XX
43	YY



SHOWN FROM COMPONENT SIDE

COMPONENT SIDE @ EEP3-26602-0  
 SOLDER SIDE EEP3-26603-0  
 OL EEP3-26604-0

LEGEND  
 ○ INDICATES STRAPPING PIN

Figure 1.





# bulletin


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## ROUTING

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SRN-901

June, 1980

APC-433

Deadline Date: 9/1/81

## IMPROVING FINAL DEVICE IN LOW BAND 60 WATT "MITREK" MOBILE RADIOS

MODEL AFFECTED: T51JJA Series

An engineering investigation has determined that all "Mitrek" 60 watt low band radios shipped prior to September 1, 1979, require a field modification during the periodic maintenance check.

This modification consists of adding L807 in parallel with base resistors R812, R813 and R817 in the Q802 final amplifier stage. The addition of L807 provides proper bias for the final device. Improper biasing will cause beta degradation and severely shorten the lifetime of the device.

It is recommended by "Mitrek" engineering that L807 be added to all units shipped prior to September 1, 1979 during the periodic maintenance check. Units shipped after this date already include the modification.

REFER NUMBER	MOTOROLA PART NO.	<u>PART REQUIRED</u>	*USER PRICE
		DESCRIPTION	
L807	24-83977B02	COIL RF	\$0.97 ea.

This coil is available from your local Motorola C & E Parts Office at no charge until September 1, 1981. Labor not to exceed 1/2 hour by an authorized Motorola Service Center can be charged to warranty using standard warranty procedure.

Reference must be made to the bulletin including model and serial numbers of radio for each order.

- 1 of 1 -

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.



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ROUTING

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SRN-902

August, 1980

APC 433

Deadline Date: N/A

## INSTALLATION OF FRONT PLUG GASKET ON "MITREK" RADIOS

MODELS AFFECTED: All "Mitrek" Radios vertical mounted with connector up

Engineering recommends that a front plug gasket be installed on all "Mitrek" units which shipped prior to October, 1979 and are vertical mounted with the connector up. (See following drawing on Page 2).

The 19 pin front plug gasket was added to prevent corrosion of the connector pins when standing water is present in the connector pocket. The front plug gasket slides over the pin contacts and is held in place by the control cable plug.

Engineering recommends that this part be added during the periodic maintenance check. This gasket is already being installed on all "Mitrek" units shipped after October, 1979.

### Part Required

Motorola		
<u>Part No.</u>	<u>Description</u>	<u>*User Price</u>
32-80020C01	Gasket	\$1.40 pk/10

\*Part may be obtained from your local C & E Parts Office.

Since this is a service aid bulletin no charges will be accepted.

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SRN-902

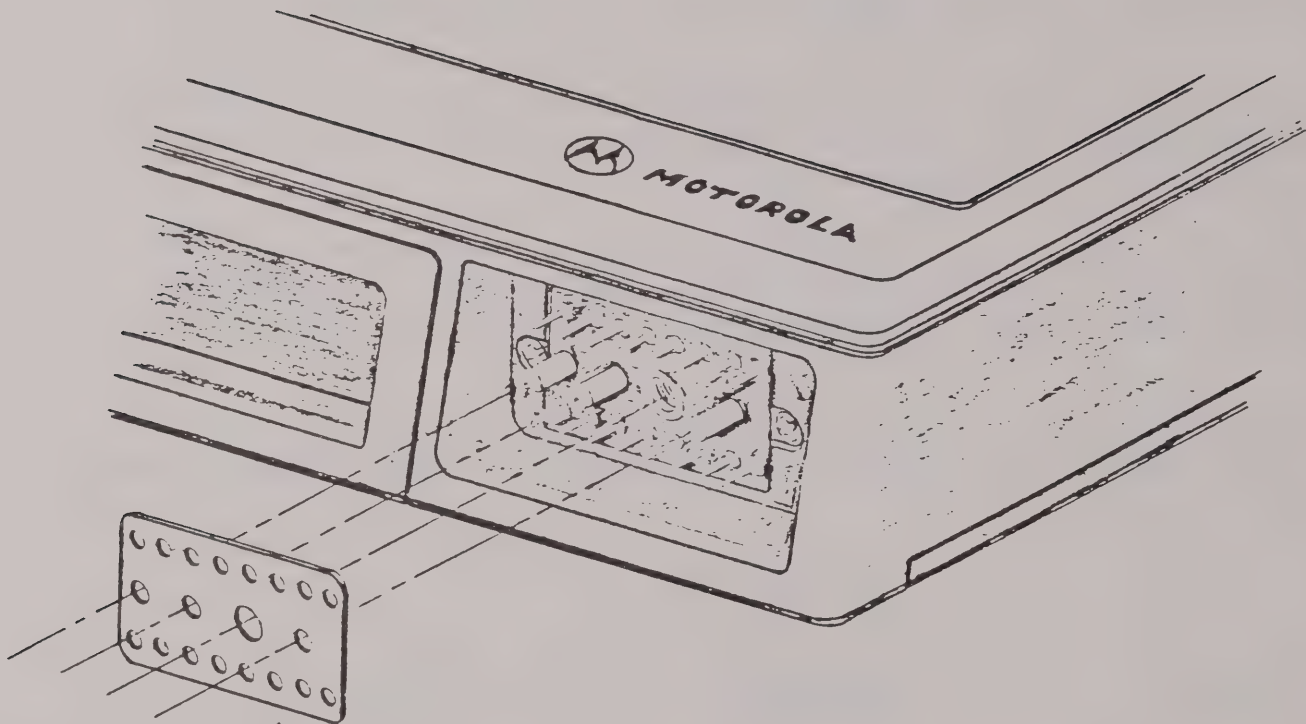
8/22/80

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\*Net User Price—Subject to change without notice.





"Outside" Front Plug Gasket  
(Part #32-80020C01)

# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

ROUTING

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SRN-904

July, 1980

APC-N/A; General

Deadline Date: N/A

TITLE: METHOD FOR LOCATING FRACTURES IN SUBSTRATES

Present day Motorola 450 and 800 MHz transmitters incorporate numerous ceramic microstrip circuits in the power amplifiers. The microstrips and associated chip capacitors provide predictable impedance matching circuits for the input and output circuits of the PA transistors. However, the microstrips are brittle by nature and as such are subject to developing cracks due to mechanical or thermal stress. Once a crack has occurred, improper transmitter operation will usually result. The problems associated with cracked microstrips are no or low power output and in some cases spurious emissions. PA transistor damage may also occur because of cracked microstrips.

Various methods of locating cracked microstrips are detailed in equipment manuals but these techniques have not proven totally effective. Another tool now available to technicians is through the use of the chemical ZYGLO\*. When a ceramic microstrip circuit is coated with ZYGLO, the ZYGLO will penetrate any cracks and remain there indefinitely. When the microcircuit is exposed to ultraviolet light the ZYGLO will fluoresce and any cracks, no matter how minor, will become clearly visible. In fact, cracks not detectable by any other means can be found with ZYGLO.

The following items are required for this method of crack detection:

1. ZYGLO (Motorola part #11-10025B15 - gallon can size).
2. Isopropyl alcohol (rubbing alcohol) available at most drug stores.
3. Two small brushes (paint or artistry brushes).
4. An ultraviolet light (commonly called a black light).  
"MINERALIGHT UVSL-25" or equivalent recommend.  
Available from ULTRA-VIOLET PRODUCTS, INC, SAN GABRIEL, CALIFORNIA. Other sources of black lights include well equipped hardware stores.

\*"ZYGLO" is a registered Trademark of the Magnaflux Corporation.

(OVER)

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\*Net User Price—Subject to change without notice.

## Procedure For Use of ZYGLO:

Step 1. Clean the microstrip with alcohol. This is especially important if the transmitter has been in a dirty environment for a while and foreign material has accumulated on the surface of the microstrip. Use of a small brush will aid in the application of alcohol. A lint free cloth or tissue should be used to absorb the alcohol and loosened dirt or grime. Allow any remaining alcohol to evaporate before proceeding to Step 2. If the microstrip is already clean, this prewashing operation may be omitted. Proceed directly to Step 2.

Step 2. Apply ZYGLO sparingly to the surface of the microstrip with a small brush. Do not use the same brush used in Step 1 above. Coat the entire surface of the microstrip uniformly with ZYGLO. Do not be concerned if the ZYGLO comes in contact with chip capacitors since ZYGLO has no detrimental effects on electronic components or on circuit operation. Allow the ZYGLO to remain on the microstrip for about 1 minute. This will allow sufficient time for ZYGLO to penetrate any cracks in the microstrips.

Step 3. Using the procedure outlined in Step 1, wash the ZYGLO off the microstrip with alcohol. This washing cycle will only remove the ZYGLO from the surface of the microstrip. Any ZYGLO that has penetrated into microstrip cracks will remain there after the washing procedure.

Step 4. Obtain an ultraviolet light (black light) source.

### WARNING

Do not shine a black light directly into the eyes because it is an ultraviolet light source and the eyes may be injured.

To make this part of the procedure effective, lower the ambient room lighting so that the room is either totally dark or very dimly lit. Shine the ultraviolet light (black light) on the microstrip. When the black light illuminates the microstrip, the ZYGLO in the cracks will fluoresce and the cracks will be clearly visible. Note, however, that any ZYGLO that has not been washed off the surface of the microstrip will also fluoresce. Areas immediately surrounding chip capacitors are somewhat difficult to wash and ZYGLO may remain there after the washing procedure in Step 3. Be careful not to interpret these areas that fluoresce as cracks. If there is any doubt as to whether the areas that fluoresce are indeed cracks, clean those areas again with alcohol and re-examine them with the black light. In some cases it may be necessary to re-coat the area with ZYGLO and then wash the area again. This may be done while the black light is illuminating the area. If cracks are found, the microstrip must be replaced. Do not attempt to repair the microstrip by soldering over the crack. Be sure to check replacement microstrips with ZYGLO before installation in the transmitter.

Part Required

<u>Motorola</u> <u>Part No.</u>	<u>Description</u>	<u>*User</u> <u>Price</u>
11-10025B15	"ZYGLO", chemical	\$37.25

\*The above item may be obtained from your local Motorola C & E Parts Office.

Since this is a service aid bulletin no charges will be accepted.







# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-905

August, 1980

APC-213

Deadline Date: 7/30/81

## LOW OR DISTORTED AUDIO IN "PULSAR" VHF MOBILE RADIO TELEPHONES

MODELS AFFECTED: T1727B, T1728B, T1729B,  
T1877C, T1878C, T1879C

KITS AFFECTED: TRN8289A I-F Board

Some radiotelephones shipped between October 1979 and March 1980 may exhibit low or distorted receiver audio resulting from drift of the i-f discriminator circuit on the TRN8289A I-F board. This drift is caused by a change in inductance of L7 if the coil has not been properly coated and/or heat soaked.

Verification of the problem can be accomplished using the following procedure:

1. As stated in service manual 68P81037E85, (under RECEIVE CIRCUITRY tab, I-F Board detail PEPS-26485, Sheet 3 of 4) adjust L7 for 0,  $\pm$  0.5 uA on meter 4 of the TEK-5 Test Bench Metering Panel.

2. Either heat the i-f board to 60°C or put the radio back into service for several days.

3. Recheck meter 4 after the radio has been allowed to return to room temperature. If meter 4 reads greater than 2.0 microamperes, coil L7 has drifted in inductance, indicating in a defective i-f board.

Field repair of defective i-f boards is not recommended as the board needs to be heat-soaked at 95°C for 1 hour after L7 has been replaced. This is per factory process.

Defective boards should be returned to the following Motorola facility that is equipped for this repair/replacement service.

(OVER)

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Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

Motorola C&E, Inc.  
Midwest Service Depot  
2227 Hammond Drive  
Schaumburg, Ill. 60196  
Telephone (312)576-5760

All radios shipped after March 15, 1980 have coil L7 properly treated.

This repair service at Midwest Service and field labor not to exceed 1/2 hour by an authorized Motorola Service Center can be charged to warranty using standard warranty procedure until July 30, 1981.

Reference must be made to this bulletin including model and serial numbers of radio for each order.

# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## ROUTING

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SRN-906  
October, 1980  
APC-433  
Deadline Date: N/A

## PROPER TESTING AND TROUBLESHOOTING OF MITREK™ RECEIVER AUDIO OUTPUT CIRCUIT

MODEL AFFECTED: All MITREK models

The following service information should be considered when the audio output circuit of the MITREK radio is being serviced.

### 1. CONTROL HEAD MODIFICATION

Before using an existing negative ground MOCOM-70™ set up to check MITREK radios, make sure that the MOCOM-70 control head has been appropriately modified as listed under MOCOM 70 Retrofit Consideration section of all MITREK instruction manuals:

#### MOCOM-70 CONTROL HEAD MODIFICATIONS

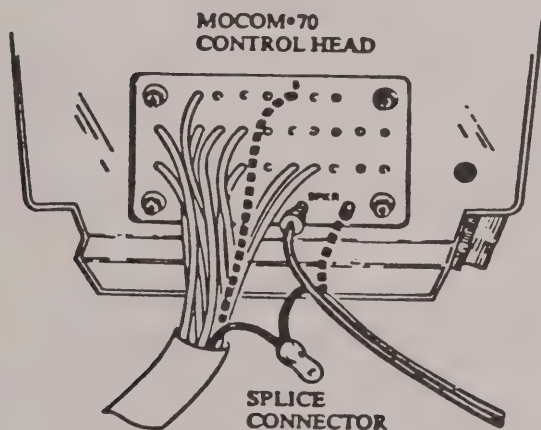


Figure 1.

Step 1. Remove the green lead from pin 5 of the MOCOM-70 control head connector. Remove the lead for the grounded side of the speaker from the same connector.

Step 2. Clip off the terminals from these two leads and strip both back 13 mm (1/2 inch).

Step 3. Twist the two leads together and crimp on the closed end splice connector (part number 29-812980) supplied with the installation kit. See Figure 1.

### 2. TEST EQUIPMENT MODIFICATION

Make sure that the test equipment to be used for checking MITREK radios is properly modified as mentioned in an earlier bulletin, SRN-895, Test Equipment Considerations for MITREK/MOCOM-70 Radios.

(OVER)

SRN-906  
10/28/80

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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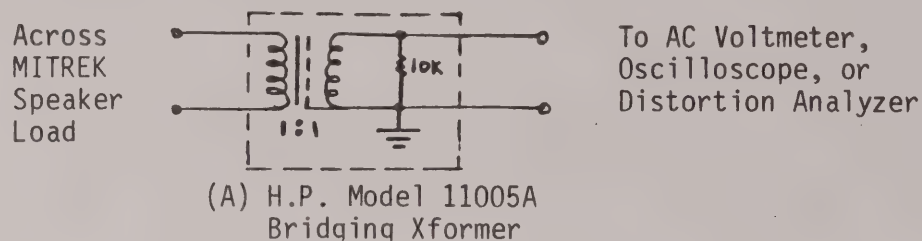
\*Net User Price—Subject to change without notice.



### 3. CONNECTION OF ISOLATING TRANSFORMER

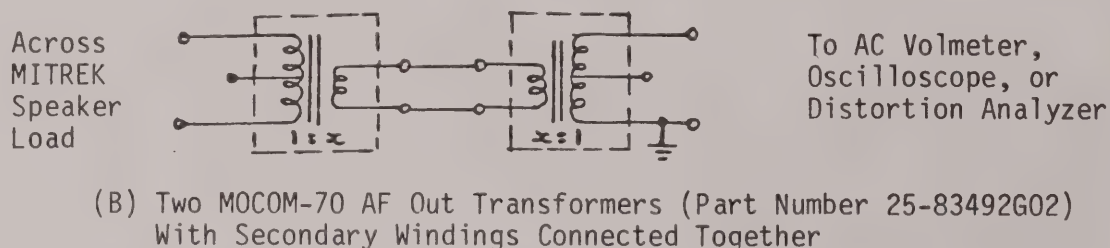
When measuring audio output across the speaker terminals of a MITREK radio, be sure that neither speaker wire is grounded in the process. Both speaker wires of a MITREK radio are "hot"; grounding either one will prevent the audio circuit from operating properly.

To avoid accidental grounding of the audio output, use of isolating transformers (such as HP11005A) is encouraged. The following shows the proper connection for using such transformer; the alternative of using two MOCOM-70 audio output transformers is also shown. The voltage readings that correspond to rated power output are also given.



For 8 W rated power output, adjust volume control or 5.05 V across ac voltmeter connected as shown.

The same technique should be used for MITREK PLUS radios. Adjust volume control for 6.2 V across ac voltmeter for 12 W rated power output. HOWEVER, the special MITREK PLUS control cable and speaker must be used.



To account for about 0.25 dB loss in the transformers, for 8 W rated power output set volume control for 4.9 V across ac voltmeter connected as shown. (6.0 V for 12 W, MITREK PLUS).

Figure 2.

### 4. MONITORING AUDIO OUTPUT VOLTAGE AND WAVEFORM

Use an isolating transformer as shown in Figure 2 to monitor audio output voltage and waveform across speaker load. Set rf generator to the carrier frequency and set the generator output level for a meter 1 reading of 35 uA to 45 uA. Check for zero audio output. Presence of any output waveform at this time is abnormal and, may be an indication of oscillation. Remove PL board, if so equipped, to see if audio output goes to zero upon removal of PL board. If so, PL board is defective. If audio output checks zero initially, apply standard

test modulation (1 kHz + 3 kHz deviation) to the rf generator and adjust rf level or 1 mV. Adjust volume control for rated power output. Check the 1 kHz output waveform on the scope. If discontinuity or spurious waveform super-imposed on the 1 kHz signal seen, then replace resistors R422, R424 and R425 of the audio final stages per Table 1.

## 5. HIGH RECEIVER AUDIO DISTORTION

In case of high Rx audio distortion, perform the following steps:

Step 1. Retune i-f coils (L107, L204, L206), detector coil (L208) and receiver oscillator warp per receiver tuning procedure. This is to ensure that receiver is properly aligned.

Step 2. Check dc voltages of U401, U402, U403B and U403A against values listed in instruction manual to ensure proper operating conditions.

Step 3. With receiver carrier deviated 3 kHz with 1 kHz tone, adjust volume control to produce 32 mV at point 41 and check ac signal levels at points 43, 42, 40 and 26. Use corresponding values in manual as reference.

Step 4. With same conditions as in 5. Step 3, use an oscilloscope (preferably with X10 probe) to monitor audio output waveforms across pin 4 (hot) and pin 3 (ground) of U401 and then U402. Check for severely clipped waveforms. If waveforms look good, proceed to Step 5. If waveforms are significantly clipped, monitor output waveform of U402 and slowly adjust volume control to the point where clipping just begins. Leave volume control at this level and monitor output waveform of U401. Replace U402 if its output waveform clips before that of U401. Otherwise, replace U401. After replacing one device, check audio distortion for improvements. Replace second final device ONLY IF high distortion persists after replacing one device.

Step 5. If both receiver tuning and audio circuit checked good, high distortion might be due to a bad detector IC, U201.

Table 1. Parts Required

Schematic Symbol	Current Value	New Value		*User Price
		Description	Motorola Part No.	
R422	430 ohms, 5%; 1/4 W	620 ohms; 5%; 1/4 W	6-124A44	\$2.63-Pk/10
R424	12 ohms, 5%; 1/4 W	22 ohms; 5%; 1/4 W	6-124A09	\$2.63-Pk/10-
R425	680 ohms, 5%; 1/4 W, or 620 ohms, 5%; 1/4 W	1.3kohm 5%;1/4 W	6-124A52	\$2.63-Pk/10

\*Radios shipped after approximately September 25, 1980 have these changes.

Labor not to exceed 1/2 hour by an authorized Motorola Service Center can be charged to warranty using standard procedure. Reference must be made to the bulletin including model and serial numbers of radio for each order.



## bulletin



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## ROUTING

SRN-907

November, 1980

APC-439

Deadline Date: 9/1/81

POTENTIAL POWER OUT FAILURE DUE TO INADEQUATE PARTS/WIRE  
CLEARANCE IN 806-821 MHz MICOR™ RADIOS

## MODELS AFFECTED: T45RTA1000A Series

Two areas of mechanical parts interference may exist in the 806-821 MHz MICOR models, both areas are related to the mounting of the TRN6020A Power Control Board.

The first area of possible interference involves the Q602 Regulator Transistor (part number 48-869570). With the board installed, the end of the transistor may contact one of the hold-down screws for the TFF6031A Antenna Switch cover plate. Tightening the board mounting screws could put destructive pressure on transistor Q602 when the transistor is not close enough to the board. If the emitter or base lead should break open, loss of transmit power will result. If the collector lead opens, the power output will be reduced to approximately 1/3 of the previous value. A damaged transistor should be removed and the replacement should be mounted in a "lay down" position against the board, as shown in Figure 1. The transistor leads should be inserted into open (unsoldered) board holes and "bent-over" before soldering to avoid mechanical strain on the leads. When it is necessary to replace the transistor, Motorola will provide a free replacement (part number 48-869570) when ordered through Motorola C & E Parts Department for the period ending September 1, 1981. When ordering the replacement refer to this SRN-907 and provide the unit serial number.

The second area of interference is the possible pinching of the BLUE, YELLOW and WHITE leads between the metering socket J601 and the Antenna switch cover plate. With any of these leads positioned under the metering sockets, it is possible that pressure against the leads could eventually cause a short circuit to the cover plate.

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

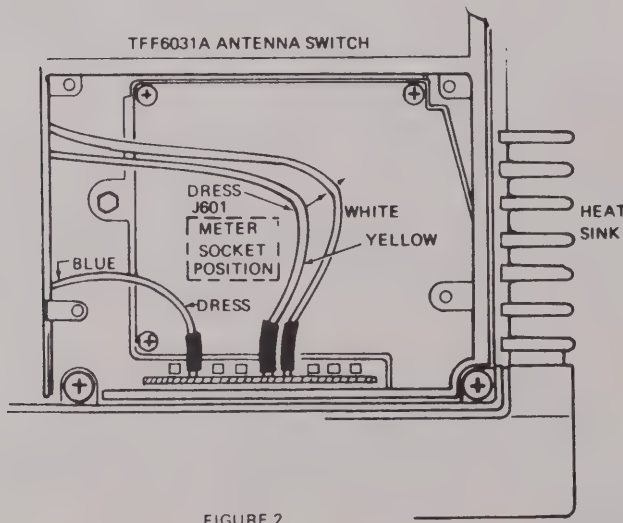
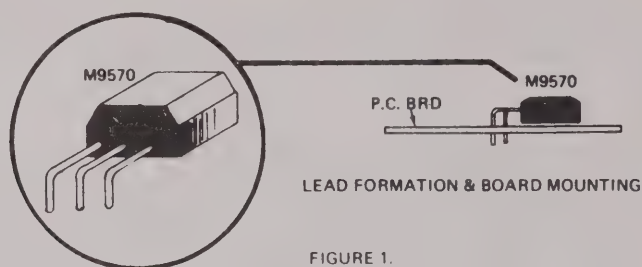
• Net User Price—Subject to change without notice.



Ground-shorting the YELLOW lead (in POS GND) or WHITE lead (in NEG GND) will disable the antenna reed switch, leaving the PA output disconnected. Ground-shorting the BLUE lead will cause loss of power out in NEG GND and maximum power out in POS GND systems. To avoid this possibility, the BLUE lead should be dressed toward the center interface board of the radio. The YELLOW and WHITE leads should be dressed toward the heat sink side of the radio. See Figure 2.

Further short circuit protection can be achieved by making sure that the TEFLON tape (part number 11-10033C33) on the antenna switch is positioned to cover the entire metering socket. This will avoid the possibility of shorting the metering cable pins to chassis ground.

This is a service aid bulletin, no labor charges will be accepted.



# bulletin

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## ROUTING

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SRN-908\*\*

September, 1980

APC 203

Deadline Date: N/A

PROPER MAINTENANCE PROCEDURE FOR INTERCONNECTING PLUG-IN PINS ON MICOR™ MOBILES, DATA COMMUNICATIONS SYSTEMS (BLU) AND BASE STATIONS

MODELS AFFECTED: All MICOR mobiles, all Data Communications Systems (Base Logic Unit) and Base Stations when applicable

Because of numerous field inputs, it is necessary to emphasize to the field the importance of proper cleaning and lubrication of the tin-plated plug-in contacts. Without proper lubrication these pins will experience a phenomenon known as fretting corrosion, which can cause intermittent or open contacts.

Therefore, Engineering recommends very strongly (without any deviation) that in the course of normal maintenance the technician should clean each contact pair with the Motorola recommended cleaner part number 11-82346D01, and then relubricate each pin with the recommended lubricant part number 11-80344A80. The lubricant and cleaner come in 8 oz. spray cans, for ease of application.

NOTE

Do not scrape or use a pen or pencil eraser to clean pins. The use of this procedure (even for a short duration) will remove the tin plating, causing complete failure of pin and increase the intermittent problem.

In those cases where the pins have failed completely due to abrasive cleaning treatment, it is recommended that the complete module be replaced. An alternate solution is to replace the individual male pins, which can be replaced if extreme caution is exercised in their removal and re-insertion of the new pin. To help in removing the defective pin (without damaging the PC board) it is imperative that a solder sucker be used to remove the solder from around the pins before attempting to remove it. The solder sucker should be used from the bottom side of the board. A long nose pliers can then be used to remove the pin while heating it. The new pin can be inserted without damaging the pin using a 7/64 nut driver.

**\*\*Supersedes and invalidates SRN-686 issued February, 1976.**

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

### CAUTION

Do not use pliers to insert new pin. It may leave scratches and teeth marks, causing early failure of the new pin. The new pins should be cleaned and relubricated before sending unit out.

### NOTE

Make sure new pins are inserted perpendicular to PC board and aligned properly to other pins before soldering.

This procedure is being suggested and encouraged to help reduce the intermittent problems due to dirty or corroded pins. For this procedure to be continually effective, it should be done during normal routine maintenance period. This is a service aid only.

### Parts Required

Motorola Part No.	Description	*User Price
29-84028H01	LUG, terminal (short pins)	\$0.65 pk/25
29-84028H02	LUG, terminal (long pins)	\$0.65 pk/25
29-84028H12	LUG, terminal (extra long pin for Base Stations)	\$0.65 pk/25
11-82346D01	CLEANER	\$9.25 can
11-80344A80	LUBRICANT	\$22.00 8 oz.



# bulletin

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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

### ROUTING

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SRN-909  
January, 1981  
APC-289  
Deadline Date: N/A

SUBJECT: SUBSTITUTE REPLACEMENT FOR THE FINAL AMPLIFIER TUBE IN IMTS, MJ AND MK BASE STATIONS.

### MODELS AFFECTED

Motorola Models Affected	Power Amplifier Models Affected	Application
T1237BB T1237BJ T1292BB T1292BJ T1330AB T1330AJ	TLD6392A	152-162 MHz, 50 W IMTS Base Station
T1240AB T1240BB T1240CB T1291BB T1332AB	TLN6502A	150-174 MHz, 250 W IMTS Base Station
T1239BB T1239CB	TLD6392A	152-162 MHz, 0-50 W IMTS Test Transmitter
T1400AB T1401AB	TLE6240A	450-470 MHz, 5-120 W IMTS Base Station

The supplier for the power amplifier tube, EIMAC, type 8560A, Motorola Pt. No. 65-83382D03 has notified Motorola of their intention to phase out this tube. Although the tube will remain available, the cost is expected to increase at a higher than normal rate as production is scaled down. A substitute tube, Motorola Pt. No. 65-83382D02, Amprex type 8560AS, has been approved and will continue to be available at a lower cost.

In the UHF application, the 65-83382D02 tube will operate at a slightly less efficiency than the 65-83382D03. However, to maintain rated output power, the maximum allowable plate input power may be increased from 250 watts to 260 watts. The power amplifier grid drive voltage minimum value may be reduced from 65 volts to 55 volts. See Figure 1, Power Amplifier Alignment Procedure, for these changes in value.

-(OVER)-

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Not User Price—Subject to change without notice.



Operating limits and FCC type acceptance of the VHF power amplifier will be unchanged, however, the reserve on these limits will be reduced. To insure normal tube life, installation of the TRN8593A Fan Kit is recommended when the 65-83382D02 Amprex tube is used. This fan kit mounts directly to the PA heatsink chimney that will force air past the PA heatsink fins.

Whenever a tube is replaced, care should be taken to insure that the flat surface of the tube mates precisely flush with the heatsink block so that heat transfer is maximized through this mechanical junction. Only a thin layer of Wakefield heat compound should be used between the tube and heatsink. Excessive use of heatsink compound can prevent proper seating of the tube against the heatsink.

The tube 65-83382D02, the Fan Kit TRN8593A and the Wakefield heat transfer compound pt. no. 11A83166A01, with instructions, may be purchased from the local Motorola Parts Depot.

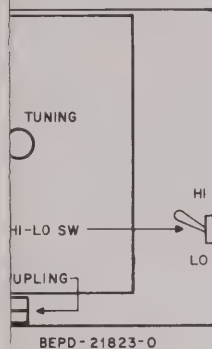
Since this is a service aid bulletin, no charges will be accepted.

Part No.	Description	*User Price
65-83382D02	Power Amplifier Tube: type 8560AS	\$ 67.50
11-83166A01	Wakefield Heat Transfer Compound	\$ 2.15
TRN8593A	Fan Kit	\$186.00

# LIMITS

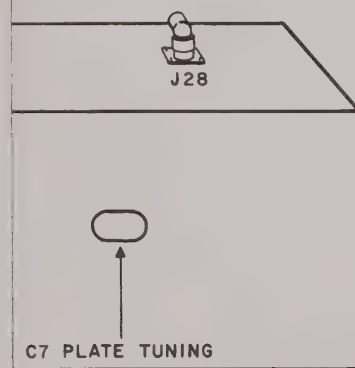
LIMITS	
s minimum	55
. maximum at	
V Ep	236
. maximum at	
V Ep	216
olts minimum	
	240

E CURRENT.



BEPD-21823-0

IT

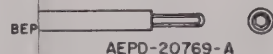


BEPD-21826-0

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NOTE:   
CIRCLED NUMBERS  
INDICATE PREVIOUS LIMITS.



Power Amplifier  
Alignment Procedure

Operating limits and FCC type acceptance of the VHF power amplifier will be unchanged, however, the reserve on these limits will be reduced. To insure normal tube life, installation of the TRN8593A Fan Kit is recommended when the 65-83382D02 Amprex tube is used. This fan kit mounts directly to the PA heatsink chimney that will force air past the PA heatsink fins.

Whenever a tube is replaced, care should be taken to insure that the flat surface of the tube mates precisely flush with the heatsink block so that heat transfer is maximized through this mechanical junction. Only a thin layer of Wakefield heat compound should be used between the tube and heatsink. Excessive use of heatsink compound can prevent proper seating of the tube against the heatsink.

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Part No.	Description	*User Price
65-83382D02	Power Amplifier Tube: type 8560AS	\$ 67.50
11-83166A01	Wakefield Heat Transfer Compound	\$ 2.15
TRN8593A	Fan Kit	\$186.00

## 1. INTRODUCTION

In the following alignment procedure, readings are taken from all three meters on the meter panel. For steps 1 through 4 and step 7, readings are observed on the EXCITER PA GRID RECEIVER meter. The POWER OUTPUT meter on the meter panel is used to obtain the readings given in steps 5 and 6. Readings for steps remaining are obtained from the PLATE meter.

## 2. TEST EQUIPMENT REQUIRED

Tuning Tool Kit TLN8818A

## 3. PRE-ALIGNMENT CONTROL SETTINGS

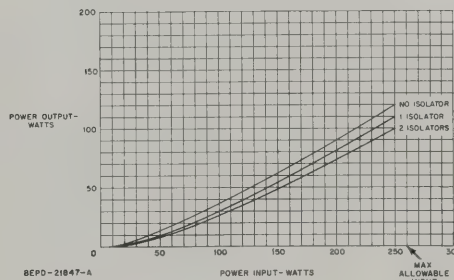
CHASSIS	CONTROL	POSITION
Power Amplifier	SCREEN VOLTAGE	MID-RANGE
	ANTENNA COUPLING Lever	Centered as indicated in pictures.
	HI-LO Power (switch on inside right wall)	HI (up)
	METER switch	PLATE CURRENT
Local Operations Panel	CONTROL	LOCAL
	LOCAL	STANDBY
	METER	PA GRID
Power Supply	MAIN POWER	ON
	HIGH VOLTAGE	OFF
Meter Panel	REV FWD	FWD

## 4A. UHF POWER AMPLIFIER ALIGNMENT FOR HIGH POWER (OVER 30 W) STATIONS

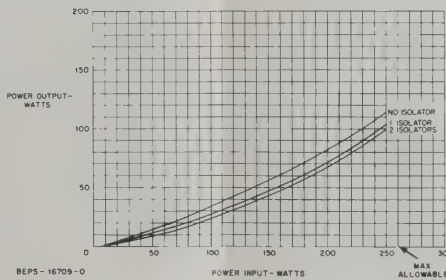
STEP	SWITCH POSITION	ADJUST	METER READING	STAGE	PROCEDURE
1	LOP Meter switch to PA GRID	PA Grid on power amplifier	Maximum	PA Grid	NOTE: Key transmitter by turning LOCAL switch on LOP to TRANSMIT position. High Voltage Switch on main power supply OFF.
2	LOP Meter switch to PA GRID	C7 on tripler-driver	Maximum	Tripler-Driver Plate	Using screwdriver end of tuning tool F, adjust C7 for a maximum meter indication.
3	LOP Meter switch to TRIPLER position. METER switch on tripler-driver to 2.	C6 on tripler-driver	Maximum	Tripler-Driver Grid	Using screwdriver end of tuning tool F, adjust C6 for a maximum meter indication.
4	LOP Meter switch to TRIPLER position. METER switch on tripler-driver to 3.	Screen Voltage (R10) on tripler-driver	110 Volts or maximum if 110 cannot be obtained	Tripler-Driver	Adjust SCREEN VOLTAGE (R10) using screwdriver end of tuning tool F to obtain meter indication. NOTE: Repeat steps 1 through 4 until no further increase in meter reading is observed.

## 4A. UHF POWER AMPLIFIER ALIGNMENT (Con'd)

STEP	SWITCH POSITION	ADJUST	READ METER INDICATION	STAGE	PROCEDURE
5		Plate Tuning on power amplifier	Maximum on power output meter	PA Plate	Place HIGH VOLTAGE switch on main power supply to the ON position (up). Using screwdriver end of tuning tool D, adjust plate tuning until a maximum power output meter reading is observed.
6		Antenna Coupling	Maximum on power output meter	Antenna Coupling	Adjust ANT. COUPLING for a maximum power output meter reading using slotted end of tuning tool D. (Refer to meter reading limits table).
7	LOP Meter switch to PA Grid	PA Grid	Maximum on PA Grid meter	PA Grid	Manually adjust PA GRID for maximum meter reading
8	METER switch on power amplifier to Plate Current position	SCREEN VOLTAGE control on front panel of power amplifier	Licensed Power Output	PA	Observing meter, turn SCREEN VOLTAGE control until licensed power output is reached.  Plate current not to exceed 230 mA.  NOTE: Repeat steps 5, 6, 7 and 8 until license power output is obtained (refer to typical power Input/power Output curve) when plate tuning and antenna coupling are adjusted for maximum output.
9	METER switch to Plate VOLTAGE position				Power input should not exceed 250 watts max. (refer to typical power output -vs- power input curve). Plate current should not exceed 220 mA max. at 1100V or 208 mA max. at 1200V. $EP \times IP$
10		HI-LO power switch			For operating power outputs of less than 30 watts, place HI-LO power switch in LO position.
11					Allow 10 minutes warmup with transmitter on and then repeat steps 5 through 9.



Typical Power Input vs Power Output Curve (No Diplexer)



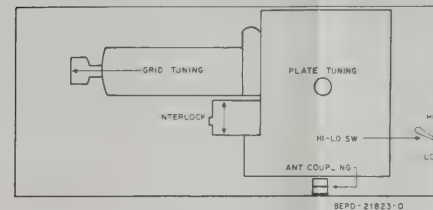
Typical Power Input vs Power Output Curve (With Diplexer)

FIGURE 1.

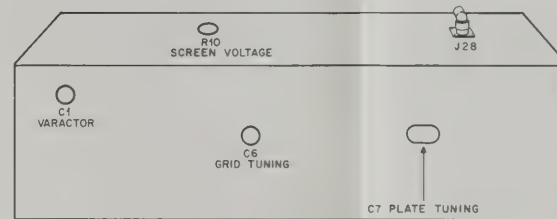
## OPERATING METER READING LIMITS

MEASUREMENTS	LIMITS
Grid Driver Voltage (Eg)	65 volts minimum
Plate Current (Ip)	227 mA. maximum at 1100 V Ep
	208 mA. maximum at 1200 V Ep
Plate Voltage (Ep)	1100 volts minimum

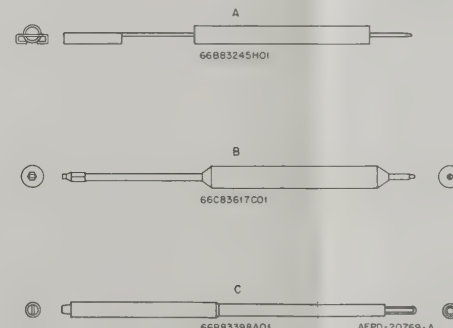
CAUTION  
DO NOT EXCEED 230 mA PLATE CURRENT.



POWER AMPLIFIER UNIT



TRIPLER-DRIVER UNIT



NOTE: CIRCLED NUMBERS INDICATE PREVIOUS LIMITS.

Power Amplifier Alignment Procedure





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# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

SRN-910

February, 1981

APC-213

Deadline Date: N/A

SUBJECT: POTENTIAL ANI SYSTEM COMPATIBILITY PROBLEM WITH RADIOTELEPHONESSystem Affected: Radiotelephone Systems Using "PULSAR" I Control Heads and MACS Circuits.

The possibility of a system compatibility problem has been reported concerning improper Automatic Number Identification (ANI) with Radiotelephones equipped with "Pulsar" I Control Heads and Motorola Automatic Channel Sentry (MACS) kits.

During ANI a parity check is made by following each odd numbered ANI pulse with guard tone. Because of the unique interlock between the hookswitch and dial on the "Pulsar" I Control Head, units equipped with MACS circuits will send guard tone (dial off normal) immediately following the completion of the ANI sequence.

If the ANI register of a particular Control Terminal is allowed to remain open longer than 190 milliseconds after the completion of ANI, the presence of guard tone may be interpreted as an improper parity check if the ANI number consists of an odd number of pulses. If this problem is occurring and adjustment of the Control Terminal ANI timing is not possible, the problem can be remedied by modifying the Control Head as detailed below: (See figure 1, 2, 3.)

1. Remove R29, C8 and CR45 from the TRN6025A Manual Control Board.
2. Cut the PC board foil as shown in Figure 2 or Figure 3.
3. Add a silicon diode, CR46 (Pt. No. 48-83654H01 or equivalent) as shown in Figure 2 or Figure 3.

The above modification to the control head eliminates the problem by preventing guard tone from being sent after ANI until the dial is placed off normal.

An alternate solution in some cases would be to reassign the mobile an ANI number having an even number of pulses. In this case, the ANI parity check will have guard tone present after the last ANI pulse, thus eliminating the problem.

Since this is a service aid bulletin, no charges will be accepted.

-(OVER)-

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Not User Price—Subject to change without notice.

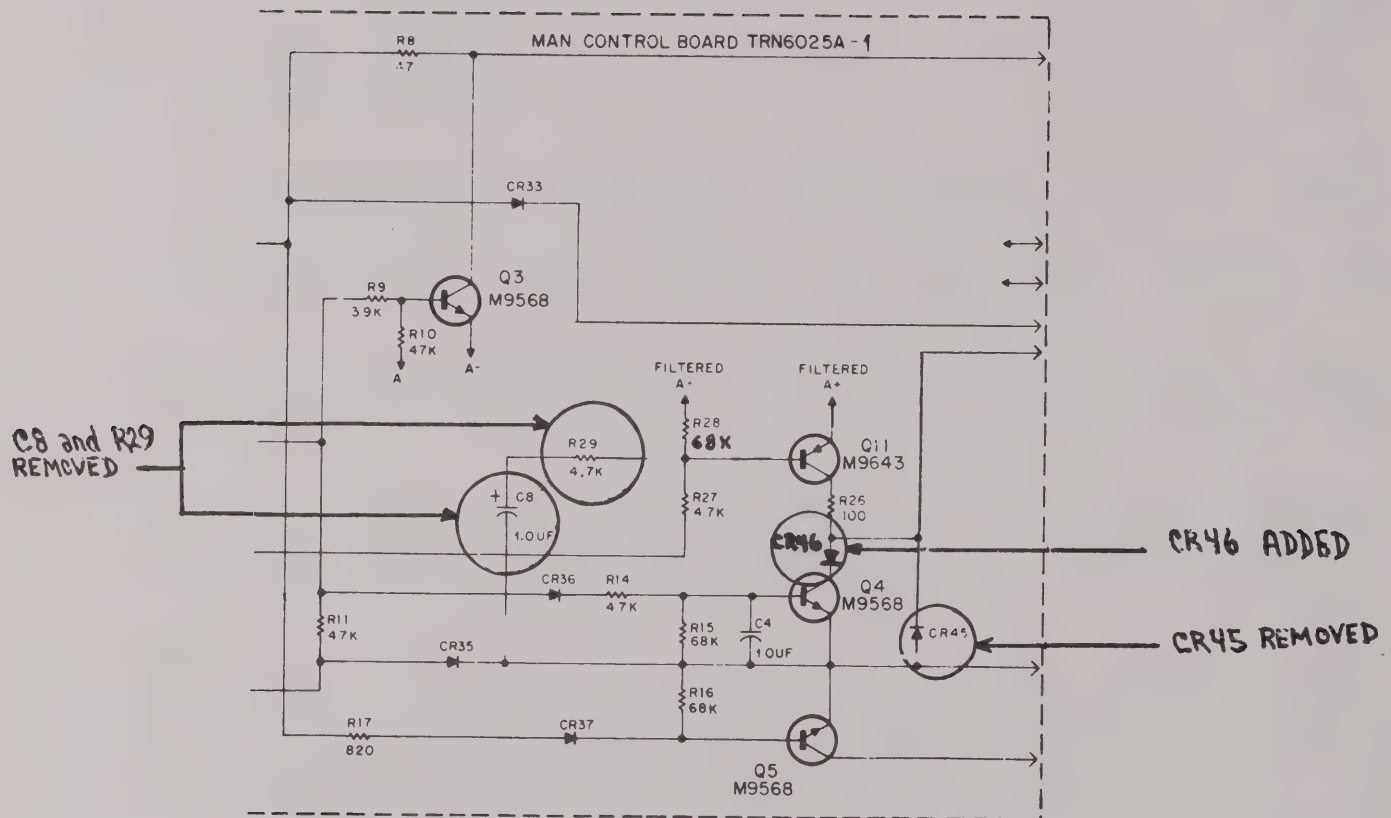


Figure 1A. TRN6025A-1 Manual Control Board Partial Schematic

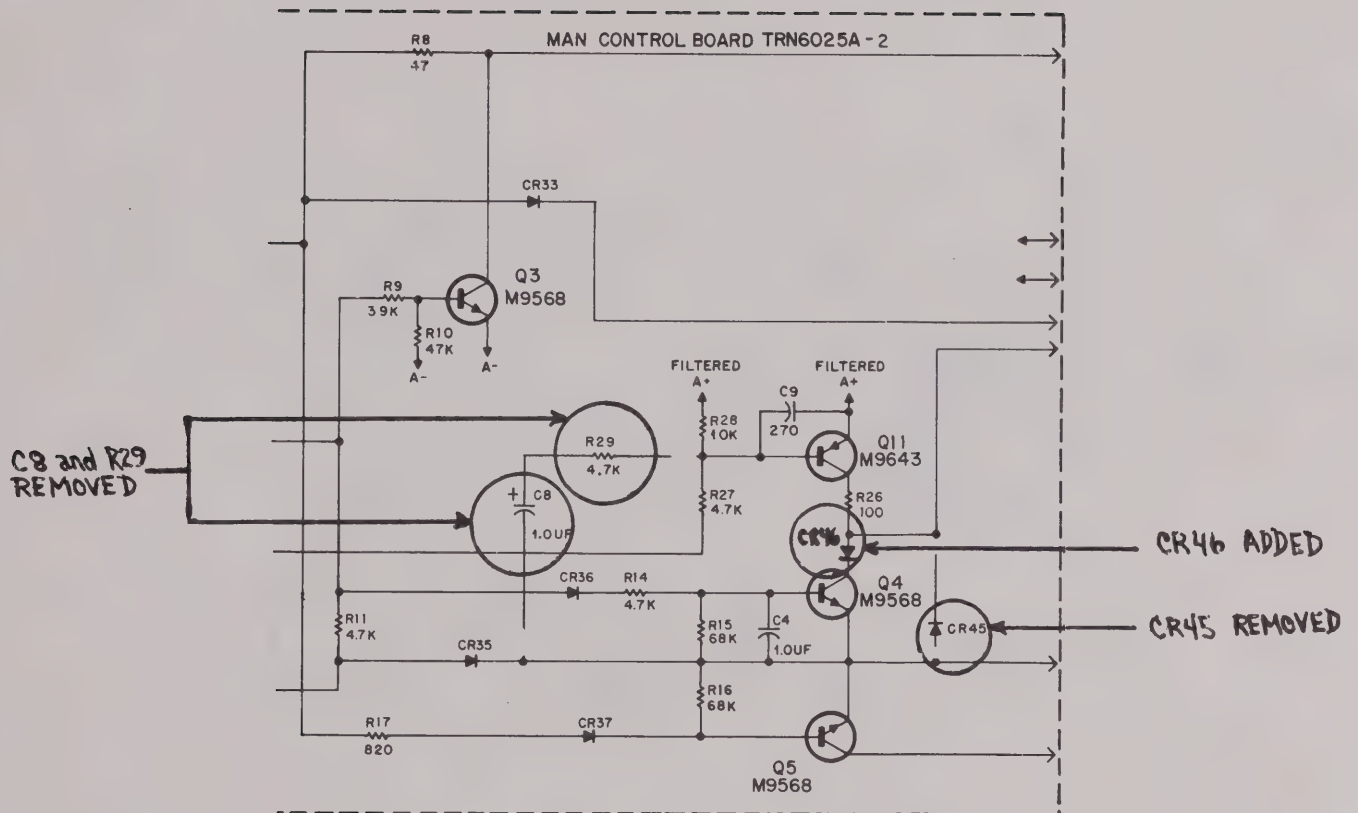


Figure 1B. TRN6025A-2 Manual Control Board Partial Schematic



# MODEL TRN6025A-1 EARLIER VERSION

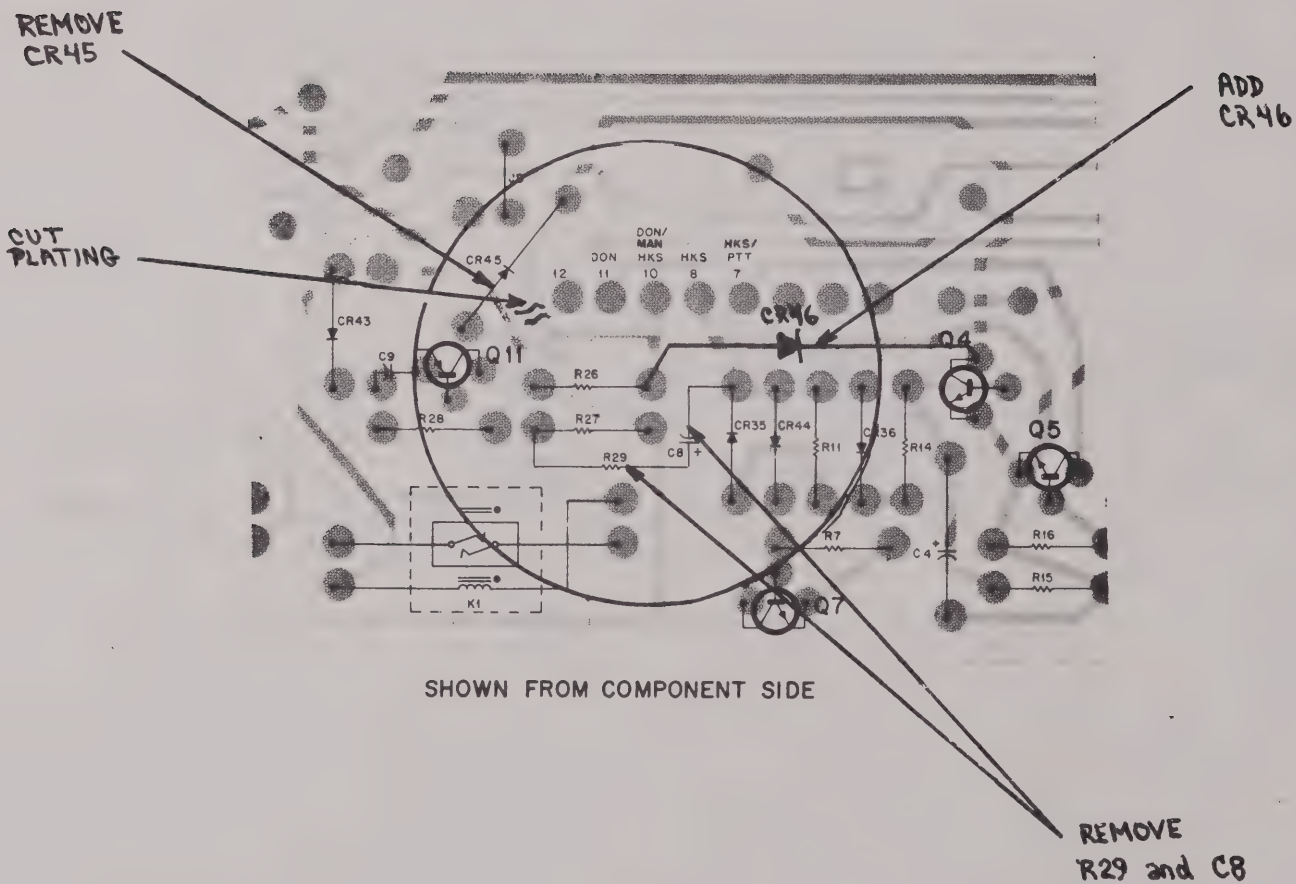


Figure 2. TRN6025A-1 Manual Control Board Partial Circuit Board Detail

# MANUAL CONTROL BOARD MODEL TRN6025A-2 LATER VERSION

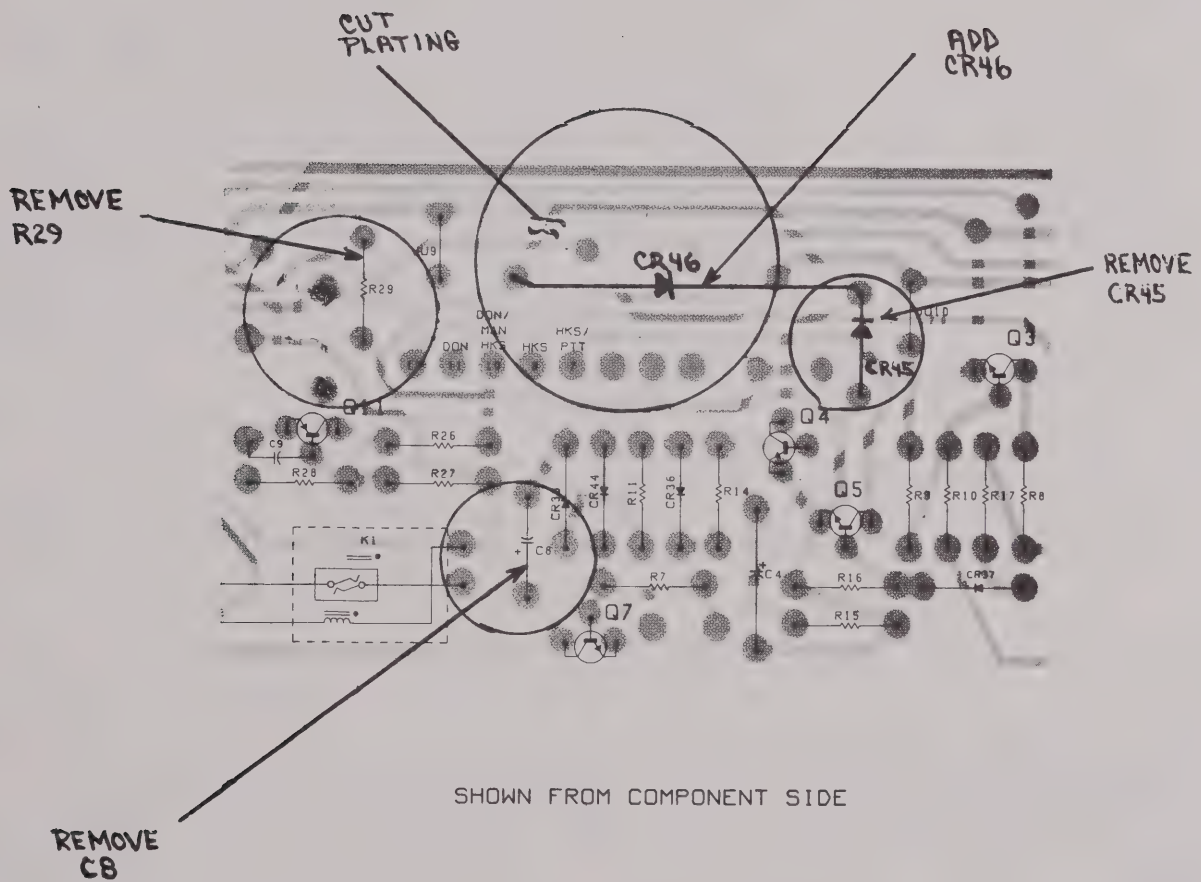


Figure 3. TRN6025A-2 Manual Control Board Partial Circuit Board Detail

Parts Required

DESCRIPTION	PART NUMBER	*USER PRICE
DIODE, Silicon	48-83654H01	\$.43 each

# bulletin

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● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## ROUTING

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SRN-911

January, 1981

APC-213

Deadline Date: N/A

## RADIO INSTALLATIONS IN LATE MODEL CADILLACS

RADIO MODEL AFFECTED: All VHF and UHF Mobile Radios

The following problems involving rf interference with the operation of the vehicle have been experienced on late model Cadillacs.

1. Digital Fuel Injection: The Digital Electronic Fuel Injection (DEFI) used on gasoline powered 1980 Eldorados and Seviles has been found to be susceptible to the 450 MHz rf signal radiation. The specific cause is the manifold air pressure (MAP) sensor. Malfunction of this sensor in the presence of rf will shut off fuel to the engine.
2. Distributor: In one instance, VHF rf interference was noted with the distributor on gasoline powered Cadillacs.
3. Electronic Climate Control: The "Programmer" of the Electronic Climate Control used on Cadillacs has been found to be susceptible to rf interference. Malfunction of this programmer will cause erratic operation of the air conditioning system.

Cadillac Engineering is aware of the problems and has notified all their dealers of the availability of replacement parts that are immune to rf interference.

If a customer is experiencing any of these or similar problems with his vehicle, General Motors has requested the customer be referred to his dealer or an appropriate Cadillac Zone Office. These offices are listed in the Cadillac owners manual.

Since this is a service aid bulletin, no charges will be accepted.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Not User Price—Subject to change without notice.





# bulletin

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## ROUTING

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SRN-920

March, 1981

APC-288

Deadline Date: N/A

## SPECIAL REPAIR SERVICE FOR VOICE SECURITY SYSTEM UNIT, CODE INSERTER

MODEL AFFECTED: P1001-X "DVP" Code Inserter

A Motorola field service facility is utilized to provide repair service for the above unit. This facility has been especially equipped for quick repair of this unit.

Due to the complex and specialized nature of the P1001-X DVP Code Inserter, field service on this item should not be attempted.

If service is required, send the unit, (in original packing carton if possible) including cables and battery supplied with the unit to:

Motorola C & E, Inc.  
Midwest Service Depot  
2227 Hammond Drive  
Schaumburg, Illinois 60196  
Telephone (312)576-5760

Please indicate plainly a return shipping address. Also include information available concerning problem(s) experienced with the unit.

Repair turnaround time from Midwest Service will be approximately ten (10) working days in normal circumstances.

Standard warranty policy will apply. Units out of warranty will incur charges on a time and material basis.

This is a service aid bulletin, no charges will be accepted.

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## ROUTING

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SRN-921

August, 1981

ACP-433

Deadline Date: N/A

## DEGRADATION IN TUNING OF UHF MITREK™ RADIOS

MODELS AFFECTED: T34, T44, T64, T74 JJA Series Radios

Some UHF "MITREK" Radios have experienced degradation in tuning because of loose locknuts on the PRESELECTOR. To solve this problem four fiberglass straps can be installed between the rf preselector housing and the locknuts.

The soft fiberglass allows the tuning nuts to seat properly. Some of the nuts may have had their teeth damaged by over-torquing and should be replaced.

All UHF MITREK radios shipped from the factory after February 2, 1981 include these changes.

## PARTS REQUIRED

Motorola			
QTY	Part No.	Description	*User Price
1	42-80011D01	STRAP NUT, retainer M8	\$1.00 PK/2
2	42-80010D01	STRAP NUT, retainer M6	\$1.00 PK/10
	2-80045A02	LOCKNUT; 8 mm	\$0.38 PK/10
	2-80045A03	LOCKNUT; 8 mm	\$0.35 ea.

This is a service aid bulletin no charges will be accepted.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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\*Net User Price—Subject to change without notice.





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## ROUTING

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SRN-923

April, 1981

ACP-277

Deadline Date: N/A

SUBJECT: SPECIAL REPAIR SERVICE FOR TRUNKING SYSTEMS CENTRAL CONTROLLER MODULES

MODELS AFFECTED: T1921A Central Controller  
T1958A Central Controller

A Motorola field service facility will be utilized to provide special repair service for the above models. This facility has been especially trained and equipped for quick repair of the following modules:

- TLN2013A - Central Site Controller
- TLN2014A - Receiver Site Controller
- TLN2015A - Transmitter Site Controller
- TRN8661A - Receiver Interface Board
- TRN8662A - Inbound Recovery Board
- TRN8663A - Transmitter Interface Board

Repair charges will be made on a time and material basis. When sufficient experience is obtained, a flat rate charge will be established.

To obtain this special repair service, return defective item(s) to:

Motorola C & E, Inc.  
Midwest Service Depot  
2227 Hammond Drive  
Schaumburg, Illinois 60195  
Telephone: (312)576-5760

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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\*Not User Price—Subject to change without notice.



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## ROUTING

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SRN-925

May, 1981

APC-303

Deadline Date: 12/1/81

SUBJECT: FREQUENCY DRIFT OF SUBCARRIER TONE ON EMERGENCY MEDICAL SERVICE RADIO  
SYSTEM

MODELS AFFECTED: QLN1919C ECG Mobile Preamplifier - Modulator Module

QLN7113B Modulator - Preamplifier Circuit Board  
(Part of Model QLN1919C)

The Field has reported a few cases of frequency drifting of the ECG subcarrier tone (1400 Hz) on the QLN7113A/B board (part of QLN1919C Module). The specs on this frequency is 1400 Hz + 100 Hz. The problem shows up as either distorted or absent telemetry of the patient's vital signs.

Engineering recommends a modification on the QLN7113A/B to minimize the effect of humidity to the 1400 Hz subcarrier tone. Because of the special test equipment required, boards exhibiting this problem should be returned to the factory. Motorola will either repair or replace these boards at our discretion.

Service shops having units experiencing the above problem (supported with written data of the frequency drift problem) should contact Product Services, Ditel 736-6039 or 312-576-6039, for information on costs and where to send defective units in for repair or replacement.

Please be advised that all field inputs indicate that only a very small portion of units shipped in 1978 may have this problem. Units leaving the plant after February 15, 1981, have been modified.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.



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## ROUTING

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SRN-926

May, 1981

APC-303

Deadline Date: 12/1/81

SUBJECT: RF INTERFERENCE IN MICOR™/MITREK™ SYSTEMS 90™ ELECTRONIC SIREN AND  
PUBLIC ADDRESS SYSTEM

MODELS AFFECTED: TLN1704A/B and 1705A/B Electronic Siren and Public Address  
System

A field input indicates a potential problem which could occur in installations where a SYSTEMS 90 siren is used with a SYSTEMS 90 scanner or a CB radio.

The problem may exist when the siren is operated in the EX RAD or MAN mode. When the scanner is operating (with siren in these modes), the scanner clock noise may be heard in the siren speakers. Also, when a CB radio is transmitting, the transmit audio may also be heard on the siren speaker.

The above problem occurs because of ground loops on the TLN5836A, B siren control board picking up stray RF.

The problem can be resolved by adding two .01 uF capacitors on the "A" version of the TLN5836 siren control board (See Figure 1) or one .02 uF capacitor on the "B" version of the TLN5836 board. (See Figure 2).

Units shipped after 2/1/81 have the modification installed. This is a service aid bulletin.

Qty.	Motorola Part No.	PARTS REQUIRED	User Price
		Description	
2	21-82428B62	CAPACITOR, fixed .01 uF +80-20%; 200 V	\$0.55 PK/2
1	21-82428B63	CAPACITOR, fixed: .02 uF +80-20%; 200 V	\$0.45 PK/2

OVER

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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\*Net User Price—Subject to change without notice.

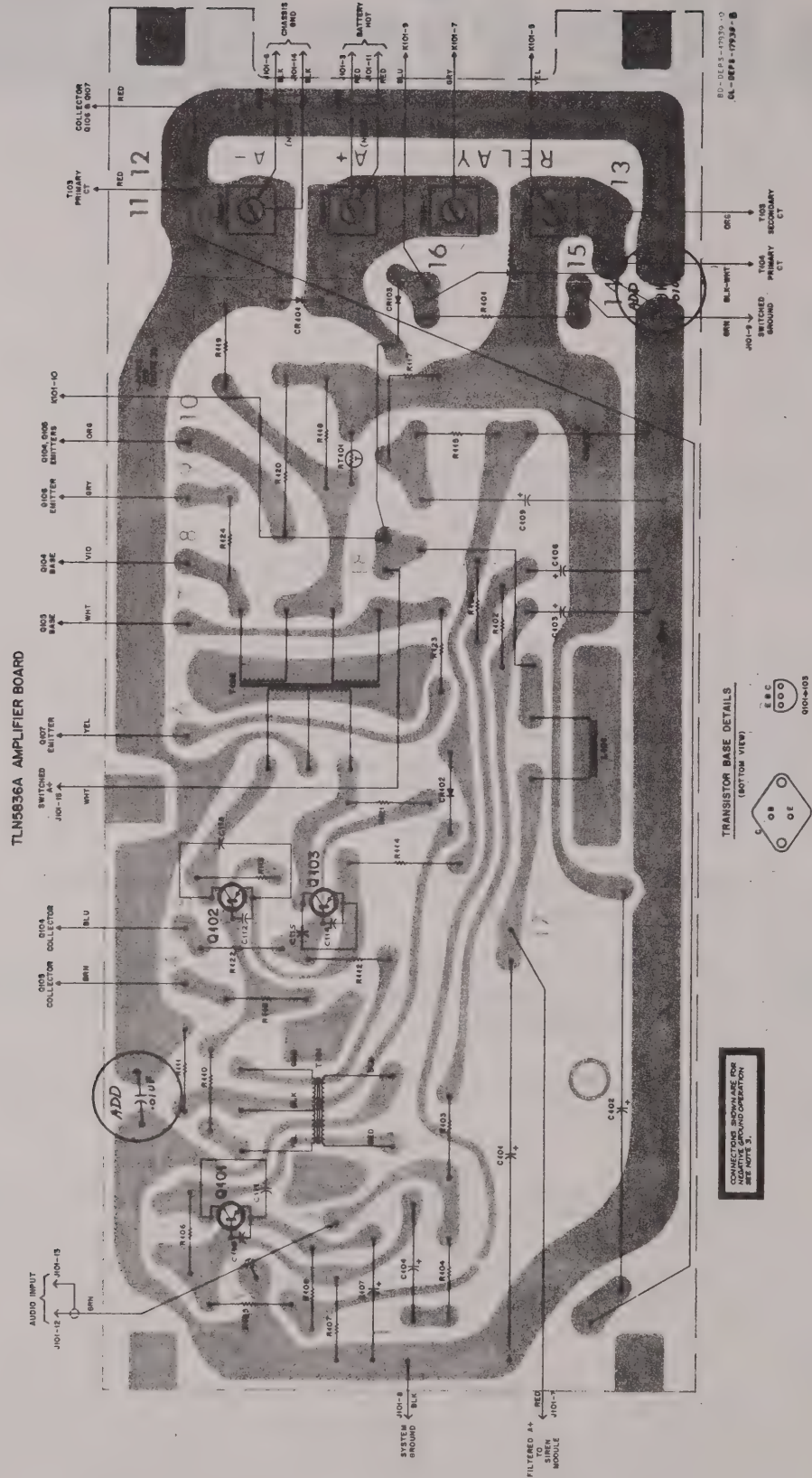


Figure 1.



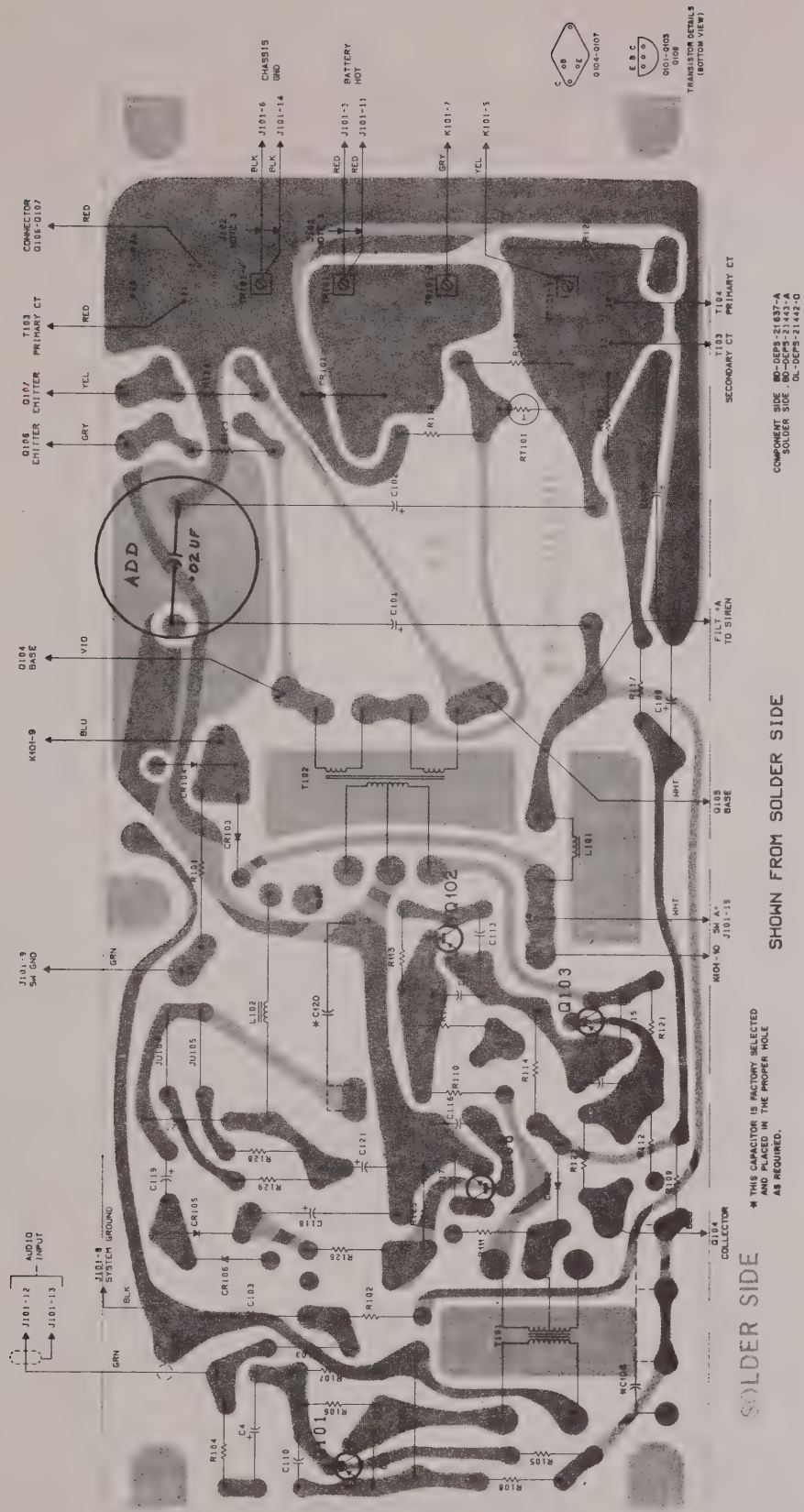


Figure 2.





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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-927

May, 1981

APC-213

Deadline Date: N/A

LOW BATTERY VOLTAGE RINGING WITH  
VHF PULSAR RADIOTELEPHONES USING MACS

MODELS AFFECTED: T1877, T1878, T1979, TLN2197

It has been determined that VHF radiotelephones equipped with MACS circuits may activate the control head ringer and auxiliary alarm (if selected) if battery voltage drops below 7 volts. Although not normally encountered, battery voltages this low can occur during engine cranking with a weak or badly discharged battery.

With a low battery voltage (7 volts), the main 10.2 V dc radio regulator and the MACS 5.0 V dc regulator may exist in a quasi-ON state. Voltage to the MACS circuit may drop to 2.0 V dc or less. At a supply voltage of 2.0 V dc the MACS microprocessor may ignore its reset command and activate the ringer line erroneously. The addition of a 12k resistor across the Zener reference diode VR101 in the 10.2 V dc regulator circuit (see Figures 1 and 2) will insure an orderly and predictable shutdown of this regulator under low voltage condition. This modification has been added to all radios shipped after April 6, 1981. In some extreme situations where the vehicle battery voltage drops below 4.0 volts during engine cranking, it may be necessary to reconnect the RESET line as shown in Figures 3 and 4.

This is a service aid bulletin. No charges will be accepted.

(OVER)

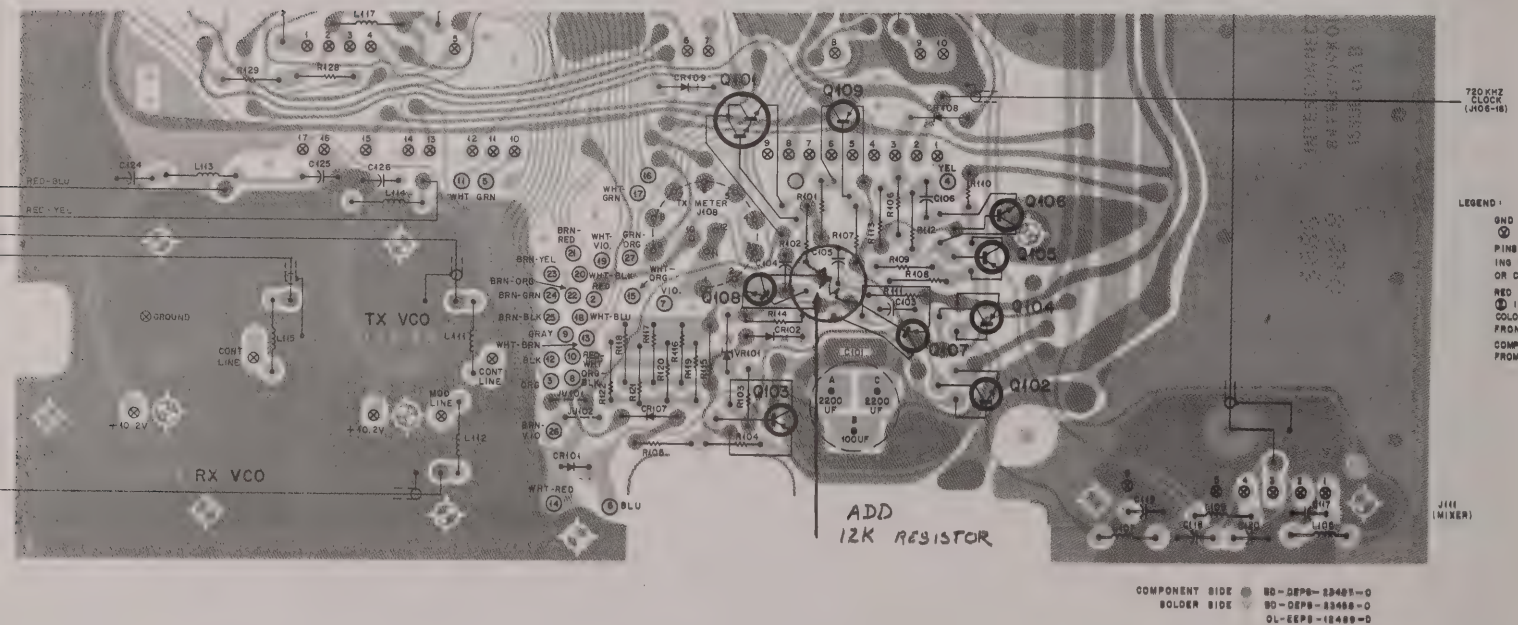
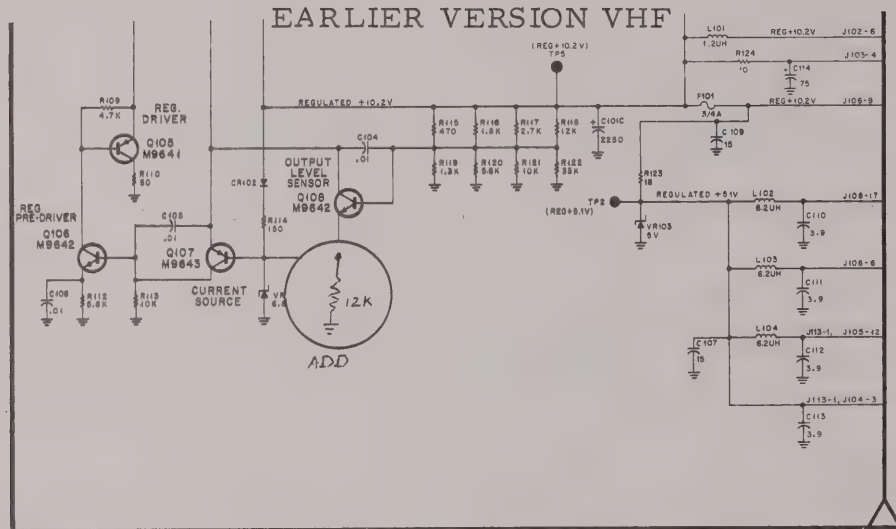
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Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Not User Price—Subject to change without notice.

## PART REQUIRED

Motorola Part No.	Description	*User Price
6-124C75	12k $\pm 10\%$ ; 1/4 W	\$1.48 Pk. 10

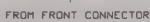


TLN5257A-2 Interconnect Board  
Schematic Diagram  
Motorola No. EEPS-11592-J  
6/16/81-PHI

Figure 1.



## 1)

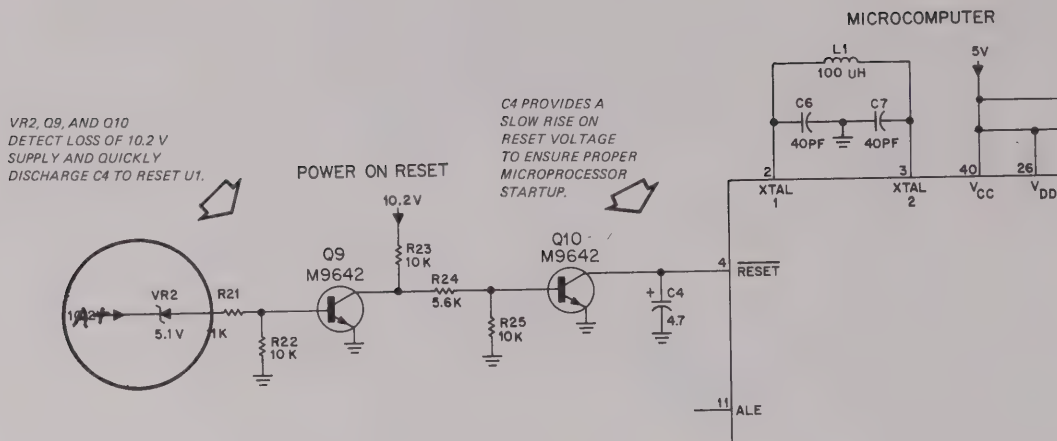


COMPONENT SIDE 8D-EEPS-20651-A  
SOLDER SIDE 8D-EEPS-20652-A  
OL-EEPS-26509-A

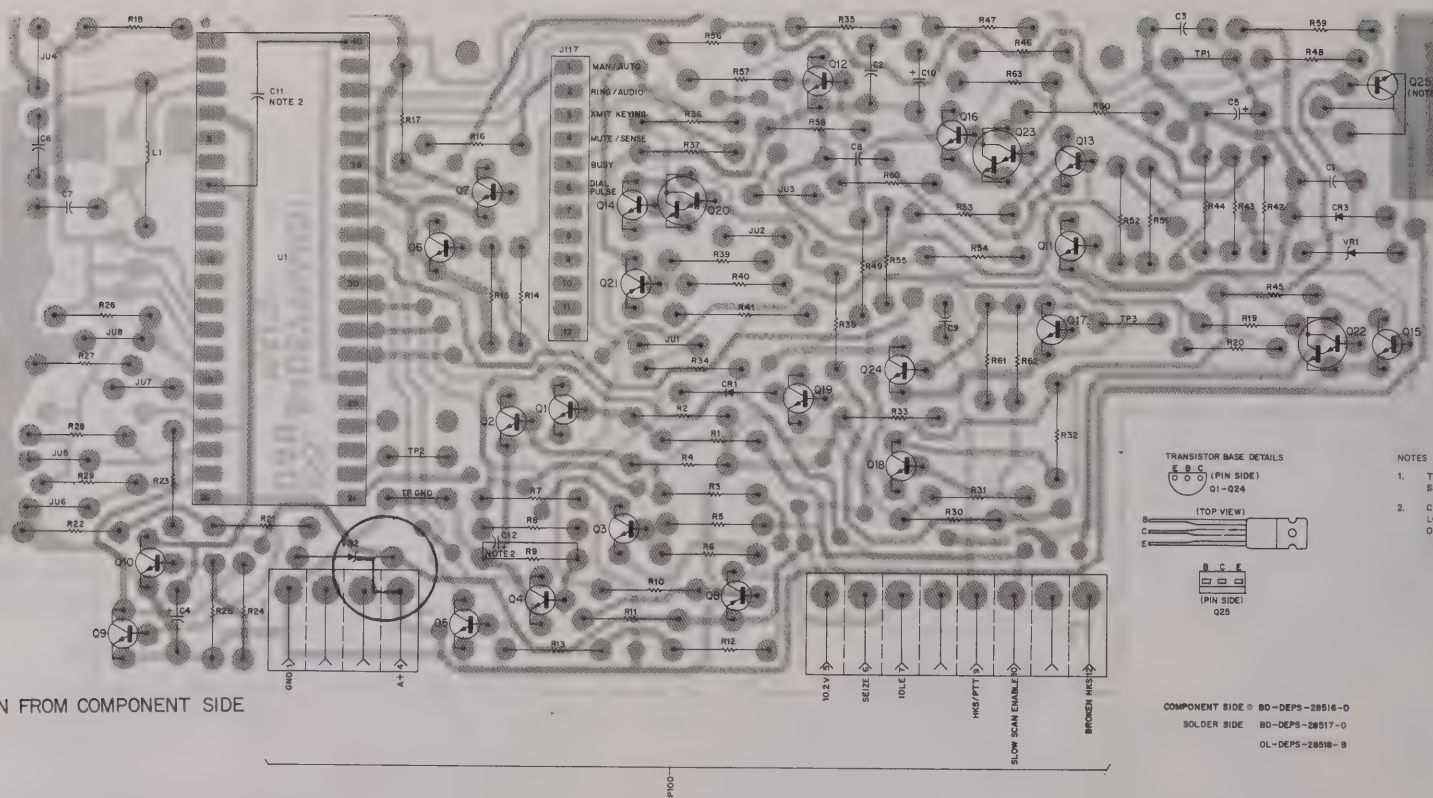
- 3 -

SRN-927





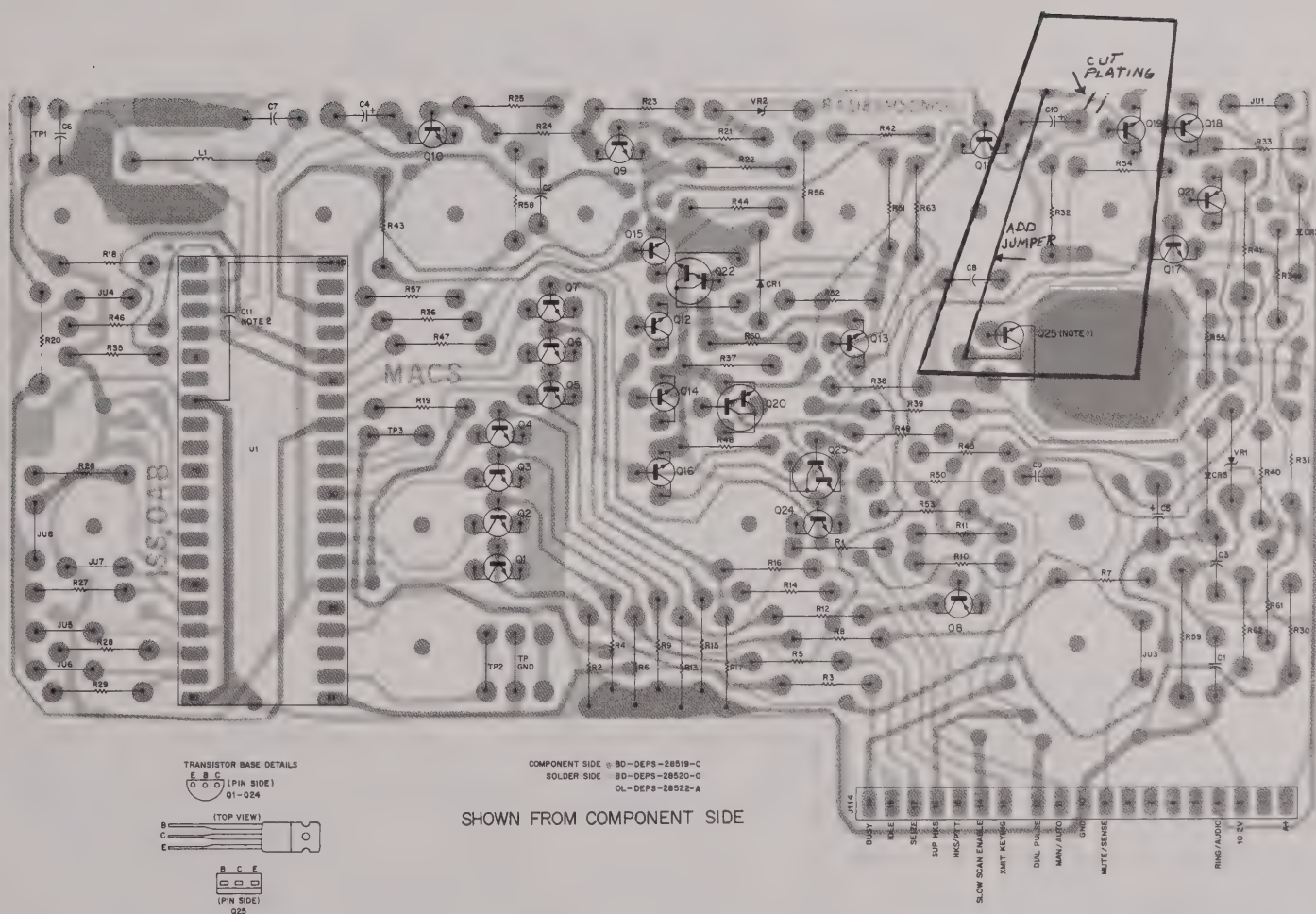
## LATER VERSION VHF AUTOMATIC CHANNEL SENTRY BOARD



Motorola No. PEPS-28729-B  
(Sheet 1 of 2)  
6/15/81-PHI

Figure 3.

MODELS TRN8879A, TRN8880A  
EARLIER VERSION VHF  
AUTOMATIC CHANNEL SENTRY BOARD



Motorola No. PEPS-28729-B  
(Sheet 1 of 2)  
6/15/81-PHI

Figure 4.





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## ROUTING

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SRN-932

August, 1981

APC-243, 429

Deadline Date: N/A

CODE PLUG ORDERS AND CONTROL FOR "MICOR" AND "SYNTOR X"  
TRUNKED COMMUNICATIONS SYSTEMS

## MODELS AFFECTED: 800 MHz Trunked Mobiles and Control Stations:

T45VBJ5G00 Series "Syntor X" Mobile

T45VSJ5G00 Series "Syntor X" Mobile

T35VBJ5G00 Series "Syntor X" Mobile

T45RTA5B00 Series "Micor" Mobile

L35VBB5174AM "Syntor X" Control station

L35RTB1160AMSP801 "Micor Super Console" Control Station

Effective immediately a controlled procurement system is used for Trunked Product code plug orders. This includes the handling of new orders, repairs, warranty, and theft replacement for these code plugs.

The Motorola Sales Representative currently assigned to the customer's account is the only person to contact with any of the above code plug requirements. Do not contact any other Sales Office personnel or Communications Component Products in Franklin Park, Illinois as this will delay order processing.

The area sales representative is the only individual who has information that combines the code plug requirement with the customer's unique system operational characteristics. This individual will relay all relevant information to the Area Trunking Coordinator, who will be responsible for having the order placed with Communications Component Products. Communications Component Products will accept no code plug orders from anyone other than designated Area Trunking Coordinators.

All code plugs replaced under warranty must be sent back to the Area Trunking Coordinator.

Price catalog sheets will be revised and instruction manual revisions (SMR'S) will be issued to reflect this new procedure.

This is a service aid bulletin. No charges will be accepted.

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\*Net User Price—Subject to change without notice.







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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-933

August, 1981

APC-213

Deadline Date: 8/31/82

SUBJECT: AUXILIARY ALARM FALSING WITH PULSAR II™ MOBILE TELEPHONES

MODELS AFFECTED: T1838, T1839, T1878, T1979 Series

Falsing of the auxiliary alarm circuit may occur if the TLN2364A or TLN2365A Junction Box is exposed to high RF levels. This could occur if the Junction Box is mounted in close proximity to the radio antenna.

Only the TLN2364A or TLN2365A Junction Box used with the PULSAR II radiotelephones shipped between April and July, 1981, exhibit this problem. The TLN1863A Junction Boxes used prior to April, 1981 do not have this problem.

If an auxiliary alarm is to be used with the radiotelephone, the following modification should be made to the TRN4830A Junction box Interconnect Board. See Figure 1.

1. Replace R10 (5.1k) with a 1.5k, 5%, 1/4 W resistor, Motorola No. 6-11009C53 or equivalent.
2. Replace R9 (7.5k) with a 270 ohm, 5%, 1/4 W resistor, Motorola No. 6-11009C35 or equivalent.
3. Add a 51 pF, 5% capacitor, Motorola No. 21-82610C07 or equivalent across the B-E junction of Q6.

The above modifications have been incorporated into all radios shipped after July 2, 1981.

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

# INTERCONNECT BOARD MODEL TRN4830A

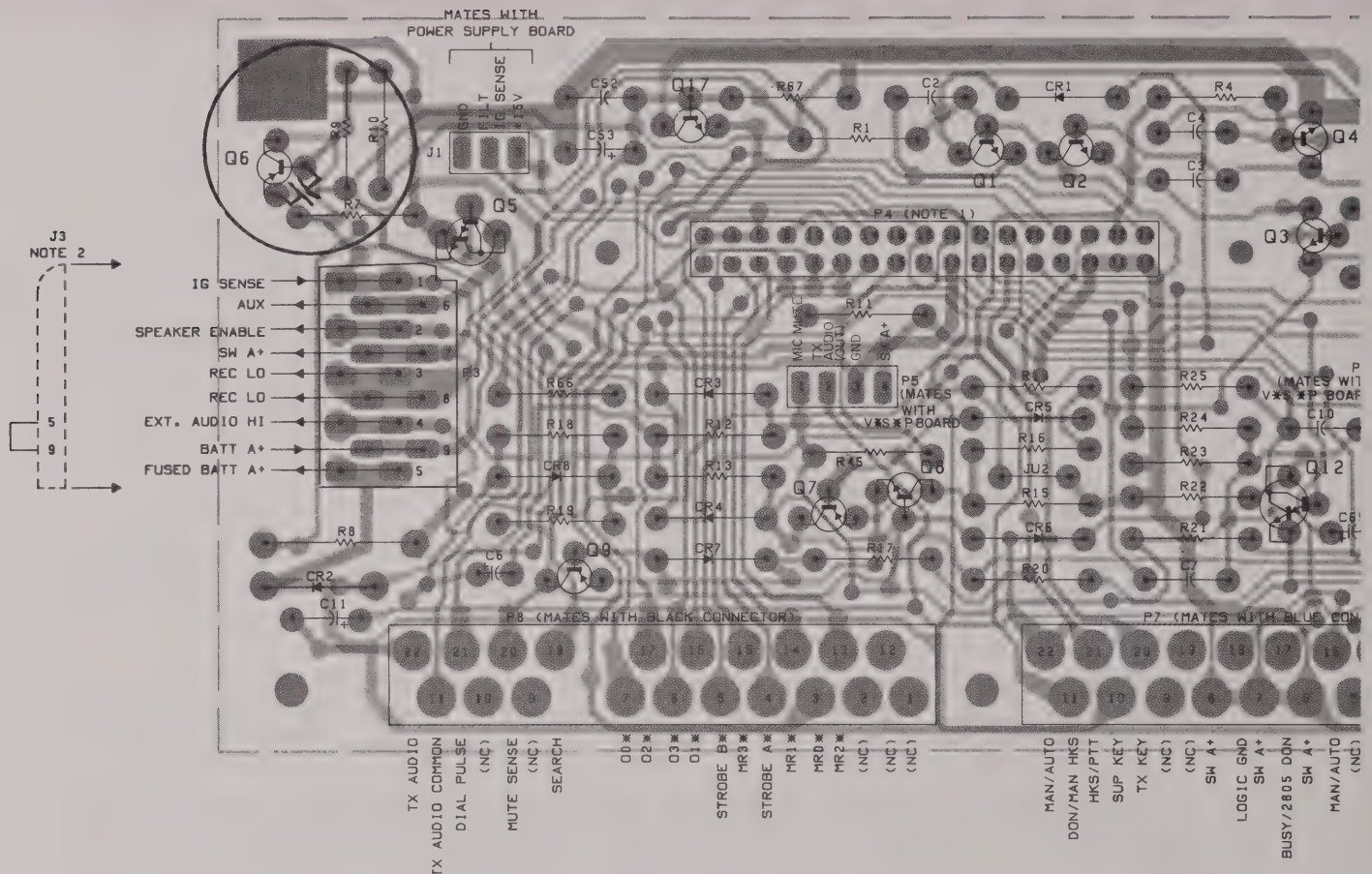


Figure 1. Parts Required

Motorola Part Number	Description	User Price
6-11009C35	Resistor, 270 ohms, 5%; 1/4 W	\$1.00 pk./10
6-11009C53	Resistor, 1.5k ohms, 5%; 1/4 W	\$1.00 pk./10
21-82610C07	Capacitor, 51 pF, 5%, 20 Volts	\$ .25 ea.

The above parts are available at no charge until August 31, 1982 from your local Motorola Parts Department.

Labor, not to exceed 1/2 hour by an authorized Motorola Service Shop, can be charged to warranty using standard warranty procedure. Reference must be made to this bulletin, including model and serial numbers of the radio for each order.



# bulletin

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## ROUTING

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SRN-935

August, 1981

APC-277, 537

Deadline Date: 6/30/82

## HOTLINE SETUP AND UPDATE INFORMATION FOR THE 800 MHz TRUNKED FIXED SYSTEM EQUIPMENT

### HOTLINE - Trunking Central Controller

A "Hotline" telephone field service support program has been set up for Trunking Central Controller effective August 1, 1981.

The Midwest Service Depot, especially trained and equipped, will provide telephone technical assistance and repair information by using this hotline.

The Trunking Central Controller Hotline is:

(312)576-5760  
Midwest Service Depot  
2227 Hammond Drive  
Schaumburg, Illinois 60195

### GENERAL

1. This bulletin contains technical tips and update information beneficial to service shops and COAM Trunked System users. It is an accumulation of suggestions and troubleshooting aids for past problems experienced in the field.
2. The Motorola Midwest Service Depot, located at 2227 Hammond Drive in Schaumburg, IL 60195 is now set up to repair your Central Controller Trunking modules (no exchange modules are available).
3. The Central Controller drop ship TPN6114A 5 volt and TPN6115A 12 volt power supply components can now be obtained directly from the C & E Parts Dept. They are now cross-referenced with Motorola part numbers.
4. Central Controller spare boards should be periodically rotated to assure proper performance when needed.
5. Since this is a service aid bulletin, no charges will be accepted for any labor described in this bulletin except for Item 7, High Temperature Problem.

- 1 of 6 -

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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## I. CENTRAL CONTROLLER - T1921A or T1958A

### 1. Retrofit Software/Hardware Changes:

Systems "Expansion Kits" (7 or 14 channel expansion or customer programming) and "Software Options" (Negative Subscriber List and Time-Out Parameters) must be ordered through a Motorola Sales Representative via a Stic-1 Sales Order form.

The complete set of current Central Controller boards (spares) must be returned to the Motorola Schaumburg plant for updating after the Stic-1 order has been processed. The main set of (6) boards must be handled/updated on a separate Stic-1 order for proper control. The Trunked Marketing Group is the plant coordinator.

### 2. Critical Power Supply Adjustment (5 and 12 volt):

The Central Controller (5) and (12) volt power supply voltage levels are critical and should be checked upon installation at the sites and during normal preventive maintenance of base station equipment (six month interval recommended). Misadjustment of a power supply can cause erratic and intermittent Central Controller operation such as failsoft or system off the air. This adjustment is stressed in the instruction manual but is included in this bulletin because some service shops had apparently not heeded its importance from the manual.

The adjustments are critical because of the TTL IC's and the low voltage (less than 4.8 volts) detectors (U23) on the Site Controller boards. The voltages must be measured on the backplane bus bar with an accurate digital voltmeter. It is necessary to take the measurements on the backplane bus bar because of the controlled 0.1 volt drop to the IC modules. If the accuracy of the voltmeter is in question, voltage error on the high side of nominal is recommended over error on the low side. The high side is recommended (+ .1 V) because the low voltage detector on the Site Controller boards cause continuous RESTARTS (system flush-out and initialization) when low voltage is sensed.

The correct levels are as follows:

- Power Supply #1 (+5 V) must be +5.15 +0.10 V.
- Power Supply #2 (+5 V) must be +5.15 +0.10 V.
- Power Supply #3 (+12 V) must be +12.10 +0.10 V.
- Power Supply #4 (-12 V) must be -12.10 +0.10 V.

### 3. Cabinet Grounding:

The Central Controller and Repeater equipment cabinets must all be at ground potential for reasons of safety and proper system operation. Although all ac power cords have a third ground wire, the site electrical grounding system may not be adequate. It is recommended that all equipment cabinets be electrically grounded to each other and to earth ground with a separate wire of #6 gauge or heavier. Some symptoms of poor grounding are no ISW decoding or damage to TIB data output IC's (i.e.; U61) during electrical storms. Each of the Trunked Central Controller boards must have adequate ground to assure reliable operation. Erratic system operation or intermittent Central Controller failures may also occur if the Central board edge contacts or backplane connectors are dirty. If a film buildup is suspected, clean the affected areas.

### 4. RAM IC Voltage Check-CSC, RSC, & TSC Controller Boards:

The collector voltage of Q2 transistor (48-869649) on all Site Controller boards must be greater than +4.9 volts. It should be measured with respect to board ground with an accurate digital voltmeter. This transistor supplies VCC to two RAM IC's that require +4.9 volts to guarantee accurate read/write operation. If Q2 collector voltage is less than 4.9 volts (i.e.; emitter to collector voltage drop greater than 0.2 volt), erratic operation can result, aggravated by high temperatures. If this occurs, the transistor should be replaced and the voltage re-checked.

### 5. Proper Q7 Transistor - Receiver Site Controller:

On receiver site controller modules (TLN2014A) transistor Q7 should be part number 48-869570. It was found that a small percentage of the original transistors (48-869594) were too slow at +60° C. This was the reason for changing to the (48-869570). The problem symptom is intermittent RSC failure resulting in system failsoft operation. Boards shipped before June 1, 1980 may exhibit this problem.

### 6. Inadvertent RESTART Using Dial-Up Modems:

The Controller CSC, RS-232 Connector Interface for the System Manager terminal was designed for dedicated MODEMS and telephone lines. Those SMRS (Specialized Mobile Radio Service) owners using Dial-up Modems find the Central Controller performs a "RESTART" (per design) when they break the communication path as a result of the Data Carrier Detect (DCD) line changing from active to inactive. One way to prevent such a "RESTART" is to eliminate the DCD connection between the Central Controller (RS-233 pin 8) and the Dial-up Modem. Then, using a 2.2k resistor, tie pin 27 (DCD) on the CSC board backplane connector to pin 32 (+12 V) of the same connector. This permanently presents an active DCD signal to the CSC module whether or not the Modem is active.

## 7. High Temperature Problem:

Trunked Central Controllers T1958A (20 channel) and T1921A (5 channel) shipped prior to 7/6/81 may exhibit one or more of the following problems when the ambient temperature near the unit approaches 60° C (140° F).

- a. Inability to properly decode a mobile request for a voice channel (ISW) resulting in the mobile failing to access the system.
- b. Improper transmission of outbound channel data (OSW) such that mobiles may not lock into the control channel.
- c. Failure light indications on any of the site controller boards.
- d. Excessive and unexplained restarts by the Central Controller.

These problems can be caused by a defective integrated circuit on the Site Controller boards and can be corrected by replacing the IC's. Boards affected are:

TLN2013A Central Site Controller  
TLN2014A Receiver Site controller  
TLN2015A Transmitter Site Controller

The IC circuit symbols used on these boards are U49 and U65. The Motorola part numbers are 51R84561L52 or 51R84118K47. Only parts identified by Motorola Logo on top of the device do not perform in this application and should be replaced. Parts identified with a TI Logo (Texas Instruments) are good and do not need to be replaced.

### Modification Procedure

- a. Remove the Site Controller boards from the Central Controller card cage.
- b. Locate U49 and U65 on each board and determine if the part has a Motorola Logo.
- c. If the IC's are made by Motorola, carefully unsolder and replace with new devices. Insure that there are no solder shorts to nearby foil runners. This is especially important on the solder side of the board where foil runners travel between IC pins.
- d. Repeat the above procedure for the spare set of Site Controller Boards.

Customer charges for labor will be allowed by an authorized Motorola Service shop and is limited to one (1) hour for both sets of boards (total 6). Payment will be made by using the R0-21-19 Warranty Form. Replacement IC, part number 51R84561L52 manufactured by Texas Instruments is available at no charge from your local Motorola C & E Part Depot, by supplying equipment serial number and reference made to this bulletin number.

The allowed labor and parts above will be available at no charge until June 30, 1982.

## II. TRUNKED REPEATER C75RCB6105BT-SP801

### 1. Transmitter Malfunction Indicated by the Central Controller:

If the Central Controller intermittently reports a malfunctioned Repeater Transmitter (yellow channel disable LED active on the TIB) the problem is likely to be the transmitter (low forward power) or the antenna network (high reflected power).

However, if the TIB channel malfunction is indicated, but the transmitter status (TSTAT) signal from the repeater is active while the transmitter is keyed as indicated by the more than 3.0 volts dc on TB3-7 on the repeater backplane, the following modification is suggested;

The change involves the Trunked Central Module, TRN8673A in the Repeater and the purpose is to increase the drive current margin to the opto-couplers (U15) on the TIB modules TRN8663A. The change consists of replacing the U3, #51-84371K74 (MC3402) to a 51-83629M39 (LM239) and changing R105 (06-00124A73) 10k to 3.3k +5%; 1/4 W (06-00124A61). Test for proper operation by first disabling, then enabling the station using the TIB channel enable/disable button. Upon enabling the station, the Central Controller will momentarily key the transmitter (green transmit LED flashes). Observe the TSTAT signal. If TSTAT is active, it will extinguish the disable LED and return the station to trunking service.

Systems potentially affected were shipped prior to June 30, 1981.

### 2. Fleet Interference:

If customer fleets report hearing other fleets, the problem is likely to be a trunked system in failsoft. If, however, the system is not in failsoft, an inspection of all system repeater receivers is recommended.



The problem may be poor grounding of the coax shield on P301 cable coming out of the mixer cavity. The mixer cavity is part of the rf casting mounted on the TRF1011B receiver assembly. If this receiver is located in close proximity to other repeater stations, receiver interference can occur. By securely soldering the coax cable at the point at which it feeds into the rf deck casting, the interference will be eliminated.

Repeaters shipped prior to September, 1980 may exhibit this problem previously reported in PSD-475.



# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

### ROUTING

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SRN-938

October, 1981

ACP-213

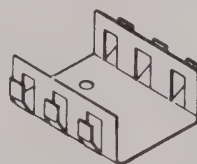
Deadline Date: 10/31/82

### POSSIBLE SHORT CIRCUIT WITH MACS RETROFIT KIT FOR EARLY VERSION VHF PULSAR RADIOTELEPHONES

Kit Affected: TLN2197A MACS Retrofit Kit

A number of TRN8880A MACS boards used in the TLN2197A MACS Retrofit Kit were built with an improper heatsink under transistor Q25. This heatsink, which is at A+ potential, may short to the TRISOLECTOR housing which is at ground potential, resulting in the cable kit 3-ampere fuse being blown. The correct heatsink projects less than 3/8" (8.6mm) above the surface of the PC board. The improper heatsink extends 1/2" (12.7mm) above the PC board.

The correct heatsink (part number 26-84275L02) is available at no charge from your local parts depot until October 31, 1982. Labor charges by authorized Motorola Service Centers, not to exceed 1/2 hour, may be charged to warranty using the standard warranty claim form. Reference must be made to this bulletin number and the serial number of the radio.



HEAT SINK

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Not User Price—Subject to change without notice.



# bulletin


**MOTOROLA**

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## ROUTING

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SRN-940

December, 1981

APC-412, 425

Deadline Date: 12/31/82

## SPLATTER FILTER FAILURE IN "DVP" MOBILES, VOICE SECURITY SYSTEMS

Models Affected: Mobiles; T34RXA, T43RXA, T44RXA, T74RXA, and T83RXA Series  
"Micor DVP" Radios Console Interface Unit, Q2209 Series

Inputs from the field have indicated a number of failures of the "DVP" Splatter Filter, Motorola Part Number 01-80702D69. This device is used on all "DVP Micor" Mobiles and in the "DVP" Console Interface Unit.

The failure mode can be determined by a mobile which has low or no transmit modulation in the "DVP" mode. The failure is caused by internal shorting of the hybrid unit.

Radios exhibiting this type of failure can be remedied by replacing the Splatter Filter with a burned-in type that does not have this potential shorting problem.

The new type can be identified by the date code number 8106 or higher. Also, units are stamped "burned-in". All old version splatter filters have been removed from stock.

The splatter filter number 01-80702D69 is available at no charge from your local Parts Department until December 31, 1982. Labor not to exceed one hour per unit by an authorized Motorola Service Center can be charged to warranty using the standard warranty procedure. Reference must be made to this bulletin number including model and serial number of radio for each order.

## Part Required

<u>Motorola No.</u>	<u>Description</u>	<u>User Price</u>
01-80702D69	Assembly Splatter Filter	\$39.25

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.





# bulletin

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## ROUTING

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SRN-941

November, 1981

APC-431

Deadline Date: N/A

## SAFETY NOTICE FOR RADIO INSTALLATIONS IN LP-GAS VEHICLES

Some operators of vehicle fleets are converting their vehicles to run on liquefied petroleum (LP) gas fuel, specifically propane. The potential severe explosion and fire hazard of LP-gas requires implementation of unique safety measures. In addition, automobiles that are converted to run on LP-gas often have the fuel container located in the trunk. It is extremely important that radio installation and service personnel become familiar with the safety issues of co-locating mobiles and propane fuel containers, and specifically the National Fire Protection Association standard which applies.

National Fire Protection Association standard NFPA 58 applies to radio installations in vehicles fueled by LP-gas with the container in the trunk or other sealed-off space within the interior of the vehicle.

Vehicles fueled by LP-gas must conform to NFPA 58 because of safety, regulatory, and legal considerations.

Section 381 of NFPA 58 requires that:

1. The passenger-carrying compartment and any space containing radio equipment shall be isolated by a seal from the space in which the LP-gas container and its fittings are located.
2. Remote (outside) filling shall be used.
3. Venting of the container space to the outside shall be provided.

The passenger-carrying compartment is isolated from the trunk space carrying the fuel container by applying a sprayed-on foam which expands to form a vapor seal. The propane installer applies the foam inside the trunk to the existing vehicle structure that separates the trunk from the rear seat and window deck. The seal is, therefore, not actually formed around the fuel container and its fittings. A vapor seal around a trunk-mount radio is not recommended because of the decreased heat transfer when air flow is blocked.

Thus, to conform with NFPA 58 most installations will require that the radio be located on the passenger-carrying side of the seal that is formed by the propane installer. Careful consideration will have to be given to situations where non-dash mount radios are currently used or required. In most cases space in the passenger-carrying compartment will have to be utilized for the radio.

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

It is not necessary for the space on the passenger-carrying side of the seal to be classified as a potentially hazardous atmosphere. Radio equipment without intrinsically safe approval can, therefore, be operated on the passenger-carrying side of the seal.

This is a service aid bulletin. No charges will be accepted.



## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-943

December, 1981

APC-213

Deadline Date: N/A

## SAFETY NOTICE FOR RADIO INSTALLATIONS IN LP-GAS VEHICLES

Some operators of vehicle fleets are converting their vehicles to run on liquefied petroleum (LP) gas fuel; specifically propane. The potential severe explosion and fire hazard of LP-gas requires implementation of unique safety measures. In addition, automobiles that are converted to run on LP-gas often have the fuel container located in the trunk. It is extremely important that radio installation and service personnel become familiar with the safety issues of co-locating mobiles and propane fuel containers, and specifically the National Fire Protection Association standard which applies.

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3. Venting of the container space to the outside shall be provided.

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Thus, to conform with NFPA 58 most installations will require that the radio be located on the passenger-carrying side of the seal that is formed by the pro-

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Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice. (OVER)



pane installer. Careful consideration will have to be given to situations where non-dash mount radios are currently used or required. In most cases space in the passenger-carrying compartment will have to be utilized for the radio.

It is not necessary for the space on the passenger-carrying side of the seal to be classified as a potentially hazardous atmosphere. Radio equipment without intrinsically safe approval can, therefore, be operated on the passenger-carrying side of the seal.

This is a service aid bulletin, no charges will be accepted.



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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-944

December, 1981

APC-213

Deadline Date: N/A

CLARIFICATION ON USE OF VEHICULAR SPEAKER  
PHONE (VSP) IN MANUAL MODE.

MODELS AFFECTED: ALL "PULSAR" RADIOTELEPHONES EQUIPPED WITH  
CONTROL HEAD AND TLN2364A VSP JUNCTION BOX.

KITS AFFECTED: TRN6504A Supervisory Board  
TLN5252A,B Supervisory Board

Product announcement literature, "A Salespersons Guide to VSP Operation", released for the Vehicular Speaker Phone (VSP) erroneously indicates there is modification information for manual mode operation in the instruction manuals or the "PULSAR II" user manual. This information was not originally in those publications; however, it will be included in future editions of the instruction manual. In the interim, SMR-4318, dated 10/27/81 will be in manuals for current shipments.

As stated in the product release, VSP may be used in the manual mode for PULSAR II mobiles. A modification to the Supervisory Board will make it more convenient to operate by eliminating the need to depress the push-to-talk button each time the user wishes to speak.

This modification is only required on Telephone Company version mobiles since the logic of the RCC Supervisory Board causes the transmitter to automatically latch.

The modification requires the addition of a 15k, +15%; 1/4 W resistor (Motorola Part No. 6-11009C77) and a M9643 type PNP transistor (Motorola Part No. 48-869643) to the TRN6504A (or TLN5252A,B) Supervisory Board.

Connect the new circuit as suggested in Figure 1. The parts may be wired to the Supervisory Board by either paralleling existing components or making use of the plated through holes that exist between the plating on the component and solder sides of the board. (Refer to the circuit board detail in section 68P81031E26 located behind the Supervisory Tab of your instruction manual).

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice. (OVER)

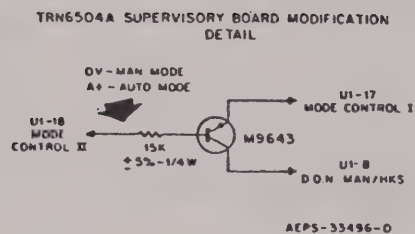


Figure 1. Modification Detail

#### PARTS REQUIRED

MOTOROLA PART NO.	DESCRIPTION	* USER PRICE
6-11009C77	RESISTOR, fixed, 15k +5%, 1/4 W	\$1.00 PK/10
48-869643	TRANSISTOR, PNP; type M9643	\$1.45 ea.

This is a service aid bulletin. No charges will be accepted.

# bulletin

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## ROUTING

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SRN-946

January, 1982

APC-N/A

Deadline Date: N/A

SUBJECT: VINYL CABINET SURFACE STICKINESS

A field input was reported noting that a vinyl surface problem exists on some vinyl coated metal cabinets used by Motorola in which there is a sticky type surface layer. The stickiness is evident by hand contact on the vinyl portion of the cabinet. The panel in question is cold rolled steel, laminated on one side with interior grade vinyl.

The plasticizer, which is an additive to make the vinyl coating more flexible will begin to diffuse to the surface of the vinyl due to heat and age. This process will occur to some extent in all surfaces, but it accelerates in conditions when there are changes in both heat and light.

It is recommended that you clean the Motorola sticky vinyl coated cabinets with a cleaning product that is commercially available on the market. This product goes under the trade name "Fantastik." When you are performing routine maintenance, and if there is stickiness, use this cleaner.

This is a service aid bulletin.

applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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## ROUTING

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SRN-947

February, 1982

APC-N/A; General

Deadline Date: N/A

FCC ISSUANCE OF GENERAL RADIOTELEPHONE OPERATOR LICENSE



## PUBLIC NOTICE

FEDERAL COMMUNICATIONS COMMISSION  
1919 M STREET N.W.  
WASHINGTON, D.C. 20554

1310

News media information 202/254-7674.

Recorded listing of releases and texts 202/632-0002.

December 24, 1981

### FCC TO BEGIN ISSUING GENERAL RADIOTELEPHONE OPERATOR LICENSES

Effective January 4, 1982, the Commission will begin issuing General Radiotelephone Operator Licenses, implementing the provisions of its Fourth Report and Order in Docket 20817.

The General Radiotelephone Operator License, formerly known as the Radiotelephone Second Class Operator License, will be issued to individuals who qualify by passing the required examinations. No change has been made to the examinations, which are the same one that have been used for the Radiotelephone Second Class Operator License.

Outstanding Radiotelephone First and Second Class Operator Licenses remain valid until they expire. Upon renewal, holders of these licenses will be issued General Radiotelephone Operator Licenses. Although final action by the Commission was effective on August 7, 1981, issuance of the General Radiotelephone Operator license could not begin until approval and printing of the actual license documents was completed.

-FCC-

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Not User Price—Subject to change without notice.



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## ROUTING

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SRN-948

February, 1982

APC-243

Deadline Date: 3/30/83

## TRUNKED SYNTOR X POSITIVE GROUND RADIOS

MODELS AFFECTED: T45VBJ7000AK, T45VBJ5G00AA and AK  
L35VBB5174AM

Field inputs have indicated there may be some non-operative Syntor X audio amplifiers, characterized by radios installed in positive ground vehicles where either resistor R448 or transistor Q449 was burned-out on the TRN8861A or TLN2237A Personality Board.

The problem has been traced to the 48-00869649 transistors used in matched pairs Q452-Q444 (NPN Part No. 01-80726D64) and Q451-443 (PNP Part No. 01-80726D63). The two vendors that supply this part are Motorola and Texas Instruments.

ANALYSIS AND MODIFICATION

1. If a mobile exhibits a non-operative audio amplifier or component burn-up, the matched pair should be examined to determine vendor origin.
2. The part made by Texas Instruments can be identified by the letters "TI" on the flat surface of the plastic package. The part made by Motorola can be identified by the Motorola logo "M". To read this marking, the metal clip holding the matched pair together must be removed and the transistors separated. If Motorola devices are identified, re-install with the metal clip holding the pair together.
3. If TI parts are identified, they should be replaced by a matched pair made by Motorola, Part No. 01-80726D64 (NPN, Q452-Q444) and/or 01-80726D63 (PNP, Q451-Q443) depending on radio usage.
4. The Motorola part can be ordered from C & E, Parts Department under the 1V numbers.
5. Important - the above applies only to those radios operated in positive ground vehicles which are experiencing R488 and Q444 failures. There is no need to replace this part in negative ground radio installations or any positive ground radio not experiencing this problem.

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Not User Price—Subject to change without notice.



Since this problem would have surfaced at time of installation and been resolved, no charges will be accepted to visit customer installations to check positive or negative ground mobiles.

For those customers with a mixture of positive/negative ground mobiles, and who may interchange them, it is recommended that the mobiles be checked for any problems during routine maintenance.

All radios shipped after October 31, 1981 have the Motorola devices.

Radios experiencing this problem, verified by the above procedure, can be repaired by an authorized Motorola Service Shop with labor not to exceed 1/2 hour charge to warranty using standard warranty procedure until March 31, 1983.

Reference must be made to this bulletin including model and serial numbers of radio for each order.

PARTS REQUIRED

<u>MOTOROLA PART NO.</u>	<u>DESCRIPTION</u>	<u>USER PRICE</u>
01-80726D64	Assembly Matched Transistor Clip	\$1.90 ea.
01-80726D63	Assembly Matched Transistor and clip; depending on usage	\$1.90 ea.

The above parts can be obtained from your local parts dept at no charge until March 31, 1983.

# bulletin

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## ROUTING

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SRN-949

February, 1982

APC-N/A; General

Deadline Date: N/A

## OIL FILLED TRANSFORMERS, CAPACITORS AND ELECTROMAGNETS CONTAINING PCB'S. (POLYCHLORINATED BIPHENYLS)

The following list of Base Station fixed equipment, but not limited to this list alone, may contain one or more of these oil filled capacitors.

Base Station Models:

N1130	T1237	KS19618L1
N1132	T1239	KS19618L2
N1133	T1240	KS19618L3
N1134	T1292	KS19618L4
N1135	T1400	KS19618L5
N1137		KS19618L8
N1139		KS19618L9
N1140		KS19618L16
		KS19618L21
		KS19618L22
		KS19618L23
		KS19618L24
		KS19618L25

On May 11, 1981 the USEPA implemented an "Interim Measures Program" requiring owners and users of transformers containing PCBs to undertake inspection, maintenance and record keeping and where the transformers pose an exposure risk to food and feed products certain reporting requirements. These requirements apply to transformers and not to capacitors or electromagnets. Complete details of the requirements can be found in your local library in the Federal Register/Vol. 46, No. 46/Tuesday, March 10, 1981/Pages 16090-16095.

Research by Motorola has confirmed our use, in the past few years, of twenty oil filled capacitors used in our Base Station Power Supply equipment or supplied by our Parts Department as replacement parts.

The following oil filled capacitors may contain PCB's if shipped before January 1, 1980. No oil filled transformers containing PCB's have been supplied by Motorola.

1 of 4

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

<u>Part Number</u>	<u>Value</u>	<u>Voltage</u>
08-82568H01	6 uf	600 VDC
08-83987A01	4 uf	200 VDC
08-83987A02	1 uf	1000 VDC
08-83987A03	2 uf	600 VDC
08-83322D01	4.5 uf	660 VDC
08-84717G01	6 uf	660 VDC
08-84717G02	7 uf	660 VDC
08-84717G03	8.5 uf	660 VDC
08-803969	3 uf	400 VDC
08-806037	1 uf	600 VDC
08-806425	2 uf	400 VDC
	(GE # 23F699)	
08-837829	2 uf	600 VDC
08-842374	3 uf	1000 VDC
08-861633	4 uf	330 VAC
08-874289	4 uf	100 VDC
	(GE # 22F960)	
08-891068	1 uf	600 VDC
	(Cornell Dubilier DYC 6100)	
08-893635	2 uf at 800 V, 6 uf at 800 V	
	(Electric Utilities # 67001)	
08-82527A	1 uf	7500 VDC
08-83300D01	1 uf	600 VDC
08-83300D02	.5 uf	1000 VDC

Please note: Capacitors shipped after January, 1980 with these Motorola part numbers have been certified by our vendors to not contain PCB's. Most new oil filled capacitors have printed on them the statement "DO NOT CONTAIN PCB'S" or "NO PCB".

Human exposure to PCB's or vapors from leaking units containing PCB's is harmful. Although inspection of capacitors containing PCB's is not required, voluntary inspection or replacement is encouraged to reduce the risk of exposure to PCB's. The following should be noted when handling units containing PCB's.

Carefully remove the unit containing PCB's so as to not cause leakage of the oil. If signs of oil leakage are present, do not handle with bare hands or breathe the vapors of the leaking oil.

Before disposing of any PCBs or PCB articles, contact the appropriate EPA Regional Office. Following is a list of the Regional Offices:

REGION 1 (Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, Vermont)

Chief, General Enforcement Branch, Enforcement Division,  
Environmental Protection Agency, John F. Kennedy Federal  
Building, Boston, Massachusetts. 02203

- REGION 2 (New Jersey, New York)  
Chief, Toxic Substances Inspection Section, Surveillance  
and Analysis Division, Environmental Protection Agency,  
Raritan Depot, Woodbridge Avenue, Edison, New Jersey  
08817
- REGION 3 (Delaware, District of Columbia, Maryland, Pennsylvania,  
Virginia, West Virginia)  
Chief, Environmental Emergency Branch, Surveillance and  
Analysis Division, Environmental Protection Agency,  
Curtis Building, 6th & Walnut Streets, Philadelphia,  
Pennsylvania 19106
- REGION 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North  
Carolina, South Carolina, Tennessee)  
Chief, Toxic Substances Section, Air and Hazardous  
Materials Division, Environmental Protection Agency, 345  
Courtland Street, N.E., Atlanta, Georgia 30365
- REGION 5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)  
Toxic Substances Coordinator, Air and Hazardous Materials  
Division, Environmental Protection Agency, 230 South  
Dearborn Street, Chicago, Illinois 60604
- REGION 6 (Arkansas, Louisiana, New Mexico, Oklahoma, Texas)  
Deputy Director, Surveillance and Analysis Division,  
Environmental Protection Agency, First International  
Building, 1201 Elm Street, Dallas, Texas 75270
- REGION 7 (Iowa, Kansas, Missouri, Nebraska)  
Chief, Toxics and Pesticides Enforcement Section, Air &  
Hazardous Materials Division, Environmental Protection  
Agency, 324 East 11th Street, Kansas City, Missouri  
64106
- REGION 8 (Colorado, Montana, North Dakota, South Dakota, Utah,  
Wyoming)  
Chief, Field Operations Section, Pesticides and Toxic  
Substances Branch, Air and Hazardous Materials Division,  
Environmental Protection Agency, 1860 Lincoln Street,  
Denver, Colorado 80295
- REGION 9 (Arizona, California, Hawaii, Nevada)  
Chief, Hazardous Materials Section, Enforcement Division,  
Environmental Protection Agency, 215 Fremont Street, San  
Francisco, California 94105
- REGION 10 (Alaska, Idaho, Oregon, Washington)  
Chief, Pesticides and Toxic Substances Branch, Air and  
Hazardous Materials Division, Environmental Protection  
Agency, 1200 6th Avenue, Seattle, Washington 98101



## HINTS TO AID IN IDENTIFYING CAPACITORS CONTAINING PCB'S

- AEROVOX - Capacitors date coded before September, 1978, and which have an "F" in the 5th position of the Aerovox part number contain PCB oil.
- G.E. - Capacitors manufactured prior to 1979 which have an "F" in the 3rd position of the G.E. part number are suspect. Also, Capacitors of the series 21L contain PCB oils. The G.E. part numbers would read, for example 21L (arbitrary 0000 numbers)
- SPRAGUE - Lettering on outside of capacitor would be CLORINO.
- MALLORY - Capacitors date coded before 1978, which have black insulators around terminals. Capacitors with tan insulators around terminals have non-PCB oils.

This bulletin is supplied as a safety aid and should be read by your equipment servicer.

# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## ROUTING

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SRN-950

March 1982

APC-243

Deadline Date: N/A

## TRUNKED MOBILE "SYNTOR X QUIK-CALL II" MODIFICATION FOR INDIVIDUAL CALL OPTION

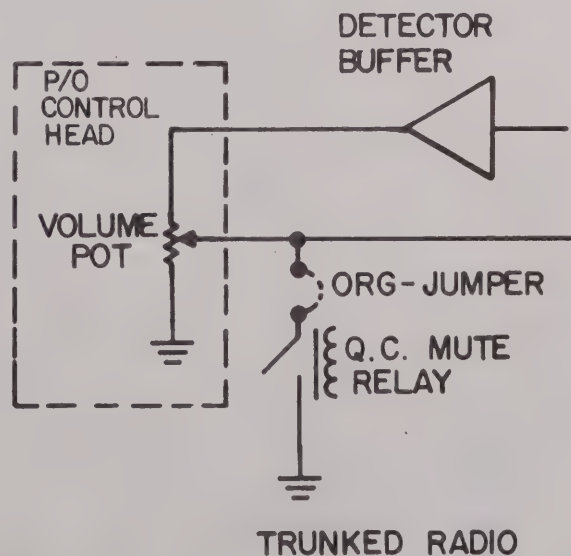
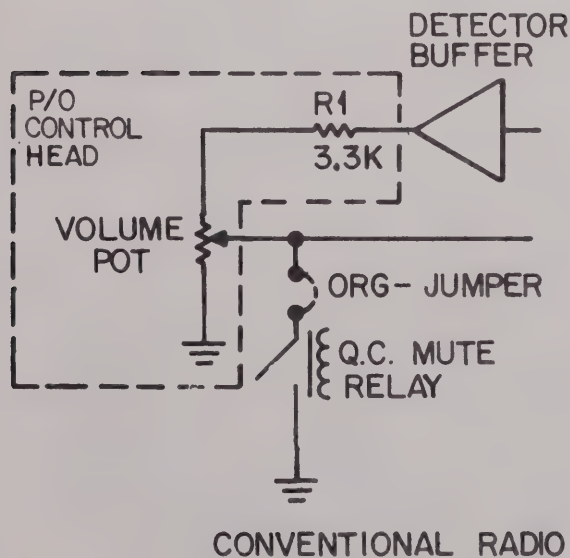
MODELS AFFECTED: T45VBJ5G00AK Trunked "SYNTOR X" Mobile  
 T45VSJ5900AK Trunked "SYNTOR X2" Mobile

The Trunked "Quik-Call II" Option W562 or W563 as shipped from factory is wired for paging mode only. Paging tones are received and an audible alert tone is sounded when the correct tones are received. Horn and lights can also be activated. No private calls to individual vehicles can be made in a trunked system. However, individual call capability can be allowed by making field wiring changes at the time of installation.

### Background Information:

The conventional "Quik-Call II" unit mutes the receive audio by shorting the wiper of the volume control to ground via a set of relay contacts. When a call is received with the correct signalling tones, the contacts are opened and the call is heard. The relay contacts are connected to the volume control wiper via an ORG jumper wire normally connected between pin 22 and 4 of the green connector P1.

Refer to the following diagrams.



(OVER)

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Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.

In a conventional radio, under full volume, muted conditions, the output of the detector buffer is shorted to ground through resistor R1, 3.3K. In a trunked radio, under the same conditions, the detector buffer is shorted directly to ground. Damage could result! If the radio is modified for individual call, a 3.3K resistor must be inserted in series with the top of the pot inside the control head.

One additional change must be made for individual call capability. Since no hang-up box is supplied with trunked "Quik-Call II", it must be provided.

#### Modification Procedure To Add Individual Call Capability To a Radio Equipped With Trunked "Quik-Call II" Option:

##### A. Parts Required:

1. Hang-up box TLN5181A or HLN4188A.
2. 3.3K Resistor 0611009C61 or 0600124A61.

##### B. Hang-Up Box Installation:

1. Remove the black-violet wire from the green connector P1-19. Insert the green lead from the hang-up box into P1-19.
2. Cut the black-violet wire, coming from P1-2, approximately 1 inch from the green connector. This will allow the black-violet wire to be removed from the cable kit and set aside.
3. Splice the black wire from the hang-up box to the 1 inch black-violet wire from P1-2, (the lug on the black wire must be removed to do this).

#### Mute Circuit Installation:

1. Remove the "Quik-Call II" circuit board from its housing and solder a jumper wire from J1-22 to J1-4. A piece of the previously removed black-violet wire can be used. Alternately, a connector pin can be put on the end of the removed black-violet wire. The wire can then be plugged into the green connector between pins 4 and 22.
- 2A. For "SYNTOR X2" Radios: Open the control head housing and cut the wire lead going to the top of the volume pot. This lead runs to the PC board from the pot and connects to J1101-16. Across this cut, solder a 3.3K 1/4 W resistor.
- 2B. For "SYNTOR X" Radios: Remove the main control head PC board from the housing. Cut the PC runner connecting the top of the volume pot to pin 16 of J1101, the black connector. Solder a 3.3K resistor across these same points.
3. Reassemble the control head and the "Quik-Call II" decoder. On radios equipped with the handset option, the hang-up box is included with the handset. However, the wires from the hang-up box have been cut flush with the end of the connecting cable. These wires must be extended before they can be connected to the green connector block.

After the above modification is made, only individual calls can be placed. A radio so equipped will not unmute its audio for any call unless the transmission is preceded by the correct "Quik-Call" coding tones.

The distinction between trunked and conventional "Quik-Call II" is not well known, and as such, trunked "Quik-Call II" may be inadvertently used for installations it is not intended for. As a consequence, the above field modification information is provided to minimize modification problems recently reported from the field.

Since this is a service aid bulletin, no charges will be accepted.

PART REQUIRED

<u>MOTOROLA PART NO.</u>	<u>DESCRIPTION</u>	<u>*USER PRICE</u>
6-11009C61	3.3K <u>+5%</u> ; 1/4 W	\$1.00 pk/10







# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●  
MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-951

March, 1982

APC-213

Deadline Date: 3/31/83

## NOISE PROBLEMS WITH RADIOTELEPHONES EQUIPPED WITH "V.S.P." FEATURE

### MODELS AFFECTED: CONTROL HEADS

TCN1233C, 1235C, 1241C

TCN1243C, 1245C

TCN1353B and 1357B

### "V.S.P." JUNCTION BOXES

TLN2364A, 2365A

## GROUND NOISE

Cross coupled grounds which exist in the layout of the TLN2365A and TLN2364A junction boxes used for all "PULSAR II" radiotelephones manufactured between March, 1981 and February, 1982, may result in the transmission of low level sub-audio band noise in units equipped with the "V.S.P." feature. Due to the audio response of the base receivers and land line networks, this noise will be undetectable to the land party. It is anticipated that in a few systems, particularly those that use companders with wide frequency responses, that the land party may hear a low frequency buzz when listening to the mobile caller. If the problem occurs in a system, it can be rectified by the following procedure:

1. Verify that the "Microphone Sensitivity Jumper" (JU2) on the radio audio board is in the proper location, TAP 4. All radios shipped from the plant use this TAP 4 location.
2. Make the two plating cuts on the TRN4830A junction box interconnect board at the locations shown in Figure 1. Add the two jumper wires to the TRN4830A junction box interconnect board as shown in Figure 1.
3. Replace the screws (Figure 2) used to hold the TRN4831A junction box power supply board to it's brackets with 4-40 x 1/4 nylon screws (part no. 03-82126B06) and captivating washers (part no. 04-84631G01). The captivating washer must be between the PC board and the bracket.

All units shipped from the factory after February, 1982 incorporate these modifications.

## AMBIENT NOISE AND WEAK SIGNAL LEVELS

While the "V.S.P." feature is designed to provide excellent performance in most vehicles, there will be some particular vehicles that will be incompatible with this feature. In order for the audio patch switching mechanism of the "V.S.P."

(OVER)

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\*Net User Price—Subject to change without notice.

circuit to operate properly, it must be able to distinguish the user's voice from other ambient noise. The "V.S.P." circuit detects the level of ambient noise within the voice band and senses when this level is exceeded (user speaking). If the ambient noise in a particular vehicle is at such a level/frequency that the "V.S.P." circuit cannot distinguish the user's voice over the noise, it will be impossible to adjust the switching pot (R50 of the TRN4826A "V.S.P." circuit board) for proper operation. This adjustment is provided to compensate for the unique acoustics of each vehicle; it must be adjusted after the unit is installed.

Customers who operate in deep fringe areas may also experience difficulty using the "V.S.P." feature. A noisy signal, particularly popping noise, from the base transmitter may be interpreted by the "V.S.P." circuit as the land user talking, causing improper voice path switching.

Finally, if the user is unaccustomed to using a speaker-phone type of hook-up, he may find some basic hints for successful operation useful: (1) The "V.S.P." circuit will not distinguish his voice from other conversation going on concurrently in the vehicle, (2) Also, he will find it helpful to reduce the volume of his AM/FM/Stereo radio while he is attempting to use the "V.S.P." feature.

The above parts are available at no charge until 3/31/83 from your local Motorola Parts Depot. Reference must be made to this bulletin, including model and serial numbers of the radio for each order. Since this is a service aid bulletin, no labor charges will be accepted.

#### PARTS REQUIRED

<u>Motorola Part No.</u>	<u>Description</u>	<u>*User Price</u>
3-82126B06	Screw, nylon; 4-40 x 1/4"	\$0.65 pk/10
4-84631G01	Washer, captivated	\$0.35 pk/10



2 WIRES ADDED

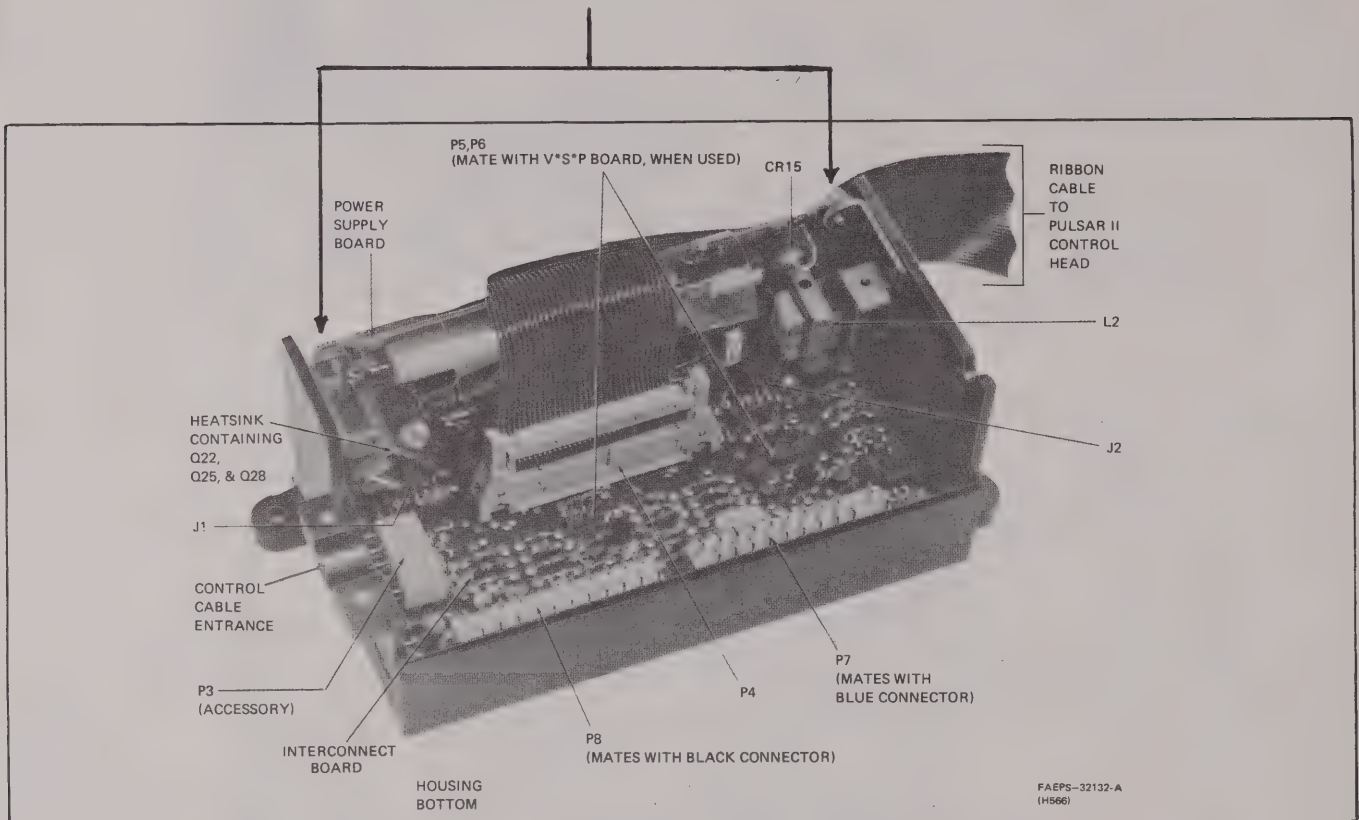
COMPONENT SIDE	BD-EEPS-32024-0
SOLDER SIDE	BD-EEPS-32025-0
	OL-EEPS-32026-A

-3-

SRN-951



USE NYLON SCREW AND WASHER IN THESE LOCATIONS  
 WASHER TO BE BETWEEN POWER SUPPLY BOARD AND  
 MOUNTING BRACKET



*Figure 2. Detailed View of Junction Box Circuitry  
 Without V\*S\*P Board*

# bulletin

**MOTOROLA**

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● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## ROUTING

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SRN-953

June, 1982

APC-243, 429

Deadline Date: N/A

## INTERMITTENT OUT-OF-RANGE TONE, TRUNKING SYSTEM

MODELS AFFECTED: T45RTA5B00AA, TRUNKED "MICOR" MOBILE.  
L35RTB1160AMSP801, TRUNKED "MICOR CONSOLETTTE" STATION

KIT AFFECTED: TLN4930D, TLN6733A CONTROL INTERFACE BOARD

Reports have been received of trunked MICOR radios sounding the out-of-range tone when PTT is pressed even though the radio is known to be in a strong signal area.

The out-of-range tone can be caused by a sticking transmit/receive reed relay, part no. 80-84157B02. In both the mobile and Consolette station, the relay schematic reference is K902.

The relay can stick in either the transmit or receive conditions. Not all contacts can stick simultaneously.

If stuck in a position that the switched +9.6V is removed from the receiver, no control channel will be received and the radio will scan for the control channel. This condition can be checked by measuring the switched +9.6V voltage to check for its presence. Alternately, the F5 through F2 select lines can be examined for channel scanning activity.

If stuck in a mode such that keyed +9.6V or keyed A- is never applied to the transmitter, upon PTT, the radio will seem to key up and send an ISW (inbound signaling word). Since the transmitter isn't operating properly, no OSW (outbound signaling word) will be received in response to the ISW so the radio will randomly rekey and send another ISW. Once PTT is pressed, the transmit light will randomly blink for a period of about 4 seconds indicating the ISW retrys. A voltmeter can verify if keyed 9.6V is being switched properly.

Most attempts at repairing this out-of-range problem have been directed at the trunked central controller. This would not be ruled out as a possible cause of the problem, but if the radio that is reporting the problem is a trunked MICOR, relay K902 could be the cause of the problem.

This is a service aid bulletin. No charges will be accepted.

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\*Net User Price—Subject to change without notice.



# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## ROUTING

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SRN-956  
May, 1982  
APC-243, 429  
Deadline Date: N/A

## VOICE BREAKTHROUGH ON TRUNKED SYSTEMS

MODELS AFFECTED: T1921A, T1958A, T1977A Central Controller

Recent reports have been received from Trunked Systems users experiencing voice breakthrough (users hearing other users). The purpose of this bulletin is to document the known reasons for such a phenomenon to occur.

1. Intermodulation (IM)

The majority of voice breakthroughs are the result of IM hits on the voice channel. The IM hit can be characterized as being heard by all members of the subfleet; distorted, over deviated, and heard upon dekey of the transmitting mobile. The sources of IM are well understood and can be addressed using conventional techniques. Operational sequence for IM detection follows.

During the message timeout period, 1 second, the repeater will unmute for a minimum of .5 second upon detection of any carrier. If a low speed connect tone is detected during the IM hit, the repeater will unmute for a minimum of 1.2 seconds. The presence of a valid connect tone in the IM signal is not unlikely since the tone is universally transmitted by all trunked mobiles.

The PARM's option gives the system owner the capability to reduce the timeout period and thus reduce exposure to IM. A reduction in the timeout period would make the system appear to be transmission trunked.

(OVER)

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## 2. Failsoft:

When the central controller fails, all repeaters revert to a failsoft mode for operation. Mobiles on the system automatically revert to this mode on a pre-assigned voice channel. The mobiles are continuously unmuted and hear all transmissions during failsoft. Failsoft is characterized by a 900 Hz tone heard every 10 seconds. Mobiles in one fleet can communicate with mobiles in another fleet during this time.

Failsoft is an error condition that should rarely occur. If frequent failsoft operation is a current problem, review SRN-935, HOTLINE SETUP AND UPDATE INFORMATION FOR 800 MHz TRUNKED FIXED SYSTEM EQUIPMENT, to aid in resolving problems that cause failsoft.

## 3. Fringe Operation:

A user can drive out of range of the system and then return within range while remaining keyed. This could result in the transmitting mobile talking to the wrong group of mobiles if the central controller were to immediately reassign the voice channel to another group of mobiles. Upon release of PTT, the transmitting mobile would be sent back to the control channel due to a mismatch of the low speed connect word on the voice channel. All mobiles in the subfleet would hear distortion followed by an on-frequency signal that was the end of the transmission of the mobile that had originally driven out of range. The user would have to be out of range of the system for a minimum of 2.2 seconds while transmitting for this to happen, plus remain keyed longer than the mobile that was validly assigned the channel.

## 4. Multiple Mobile Carriers:

Fleets with undisciplined users can have multiple mobiles keyed on a voice channel. If the central controller can no longer recognize the connect tone due to the multiple carrier distortion, the channel will be assigned to another group of users similar to the fringe operation case.

## 5. Multiple System Access:

The minimum distance for channel re-use is 70 miles. Mobiles placed between two systems could access both of them. This problem is resolved through the use of SP connect tones on the voice channels. In addition to the SP tones, the control channels assignable by the central controller and scanned by the mobiles are limited from the standard four to two. If one mobile is accessing both systems, all mobiles with the same fleet/subfleet ID on the other system would hear one side of the conversation. The mobile transmit carrier would be on frequency and possibly noisy due to the fringe area operation. The mobile in the fringe area between the two systems could hear conversations from the other system if the fleet/subfleet ID matches. The use of SP tones

does not eliminate the problem of a mobile in the fringe area hearing the other system. However, it does prohibit this mobile from communicating with the wrong group of users. The SP tones provide protection for the path of mobile to base receiver. If a system requires SP tones, the salesman must be involved to order changes to the central hardware and software equipment.

#### 6. Defective Tone Detector:

If a tone detector on a voice channel is intermittent in operation, the central controller may falsely disconnect the channel and reassign to another user. The effect would be the same as for the fringe operation case.

#### 7. Roaming Mobile:

Each system has a unique ID transmit on the control channel once every 3 seconds. When a mobile is initially powered up, it will transmit and receive on any control channel it can find. If an improper ID is received, it will move off that channel and will search for another control channel. The mobile will not transmit or receive until the correct system ID is detected. If a user were to turn on the radio and immediately keyup, the unit may transmit on the wrong system. Once it went back to the control channel and received the system ID, it would be prohibited from further action.

This problem occurs when a mobile is driven out of the normal operating range of a system, and can only occur during the first 3 seconds after the radio is turned on or a new code plug is selected. In addition, this other system would have to have the same control channel frequencies assigned.

#### SUMMARY

IM is responsible for the majority of the occurrences of voice breakthrough. Use established techniques to investigate and resolve IM problems if they apply to your trunked system. If further assistance is required, contact your Motorola Salesperson or Area System Engineer.

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# bulletin

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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-960

May, 1982

APC-213

Deadline Date: 4/30/83

LOSS OF EXTERNAL SPEAKER AUDIO WITH EARLY  
VERSION PII CONTROL HEADS.

MODELS AFFECTED: All radiotelephones equipped with  
Pulsar II type Control Heads.

A potential audio problem may exist with Pulsar II Control Heads  
manufactured between June, 1976 and October, 1979.

On these units, a PC board runner on the cradle Audio/Logic board  
(84-84775K01 issue T, A, B,) passes underneath one of the housing mounting  
bosses. After prolonged vibration, the metal insert in the housing boss can  
abraid through the PC runner causing an open circuit (See Figure 1). If this  
runner opens up no audio will be sent to the external speaker.

To prevent this problem, it is recommended that a mylar insulator, Motorola  
Part No. 14B83570N01 be installed as shown in Figure 1.

The insulators are available at no charge until April 30, 1983 from your  
local Parts Depot.

This is a service aid bulletin. No labor charges will be accepted.

(OVER)

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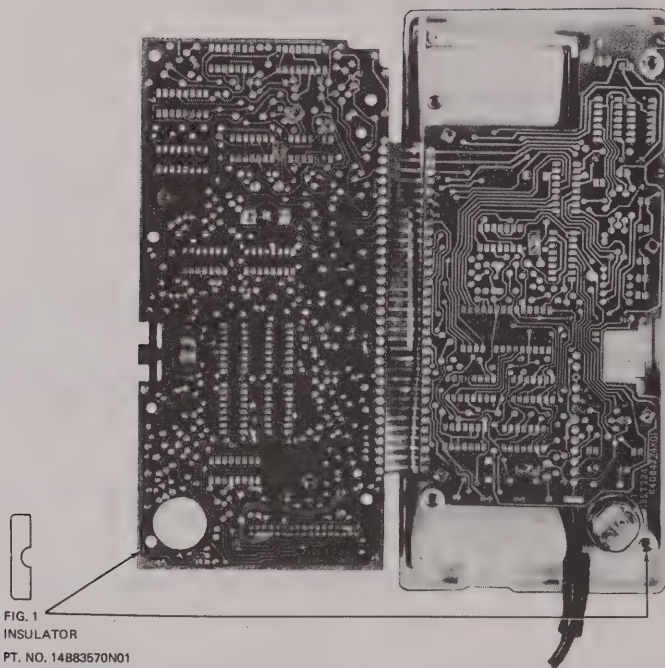


FIG. 1  
INSULATOR  
PT. NO. 14883570N01  
TO BE ADDED  
AS SHOWN

# bulletin

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## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-961A\*

September, 1982

APC-213

Deadline Date: July, 1983

## FREQUENCY GENERATION UNIT (FGU) FAILURE WITH UHF RADIOTELEPHONE

MODELS AFFECTED: T1737A, T1738A, T1739A, T1837, T1838, T1839, T1840, T1841  
KS21866L11, KS21866L12, KS21866L51, KS21866L52

Recent reports have indicated that a potential problem exists in UHF radio-telephones manufactured between November, 1979 and February, 1982. During this period, the resistors used on the TRN6490A Power Splitter Hybrid in the FGU were of a non-passivated type.

Over an extended period of time, this lack of passivation could allow the silver used in the resistor terminations to react with excess sulphur that outgases from the black rubber feet on the cover plate. This can eventually result in an open resistor and consequent circuit failure. These hybrids can be identified by the lack of green solder resist covering the hybrid resistors.

The solution to this potential field problem is to remove the source of the sulphur by replacing the black rubber feet on the cover plate with white sulphur-free rubber feet, Motorola Part No. 75-84180K03. These feet can be pulled off and pushed on without the use of any tools or adhesive.

It is recommended that the rubber feet on the cover plates of both the Power Splitter and VCO (see Figure 1) be replaced when the radio is brought in for normal maintenance or annual frequency check. Due to the length of time required for the interaction of sulphur with the resistor termination, it is not necessary to recall the radio specifically for this potential problem.

All radios shipped from the factory since March 1, 1982 use sulphur-free rubber feet. These units are marked with a suffix -2 on the top of the FGU (TLE1741A-2).

The white rubber feet, Part No. 75-84180K03 are available at no charge until July 1, 1983, from your local Motorola Parts Dept.

(OVER)

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\*Not User Price—Subject to change without notice.

EPD-21007-B



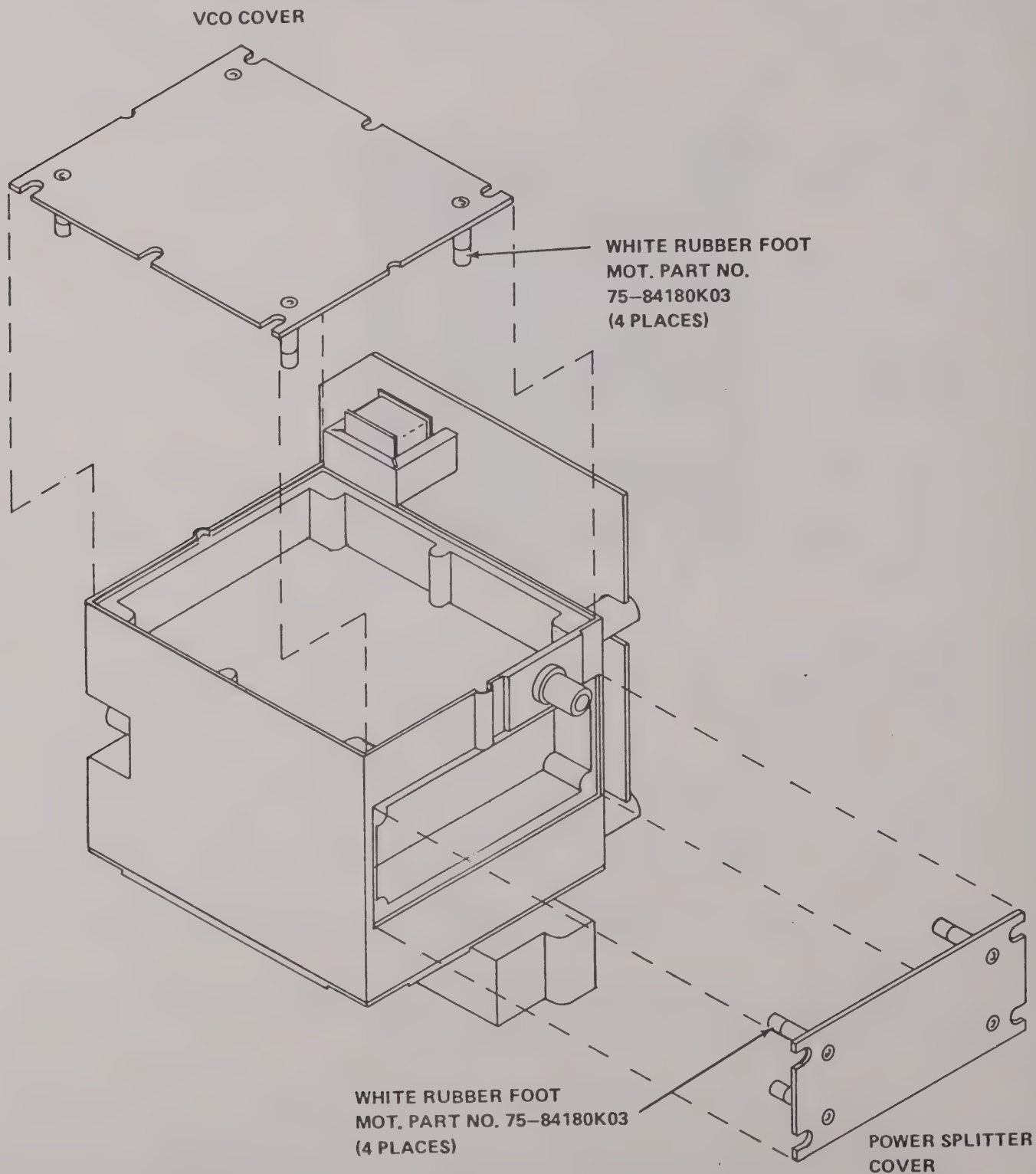
Labor, not to exceed 1/2 hour by an authorized Motorola Service Shop, can be charged to warranty using the standard warranty procedure.

Reference must be made to this bulletin, including model and serial numbers for each order.

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\*SUPERCEDES AND INVALIDATES SRN961 ISSUED JUNE, 1982.  
ISSUE A; MODEL NUMBERS CORRECTED

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# bulletin

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**ROUTING**

SRN-962

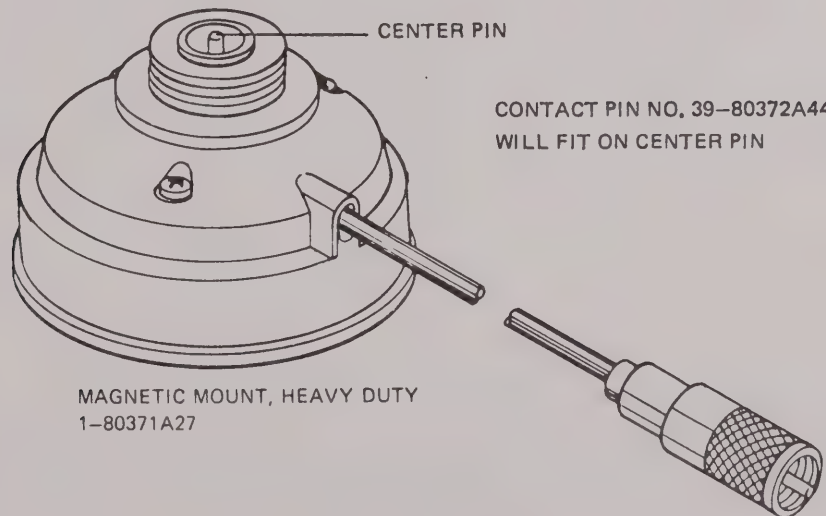
June, 1982

APC-272

Deadline Date: 9/30/82

**MOBILE ANTENNAS USING MAGNETIC MOUNTS****MODELS AFFECTED: RRA4686A/RRA4690A**

When using the magnetic mount (Motorola No. 01-80371A27) to mount mobile antenna series RRA-4686A thru RRA-4690A, an additional part is required to fit on the center pin of the mount. This will correct intermittency problems caused by the center pin not making the proper contact with the mount. The part, supplied at no charge until 9/30/82 is a contact pin, Motorola Part Number 39-80372A44, and is available from C & E Parts. Antennas purchased after 6-11-82 will have the additional part included. This is a service aid bulletin. No charges will be accepted.



MAGNETIC MOUNT, HEAVY DUTY  
1-80371A27

CONTACT PIN NO. 39-80372A44  
WILL FIT ON CENTER PIN

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# bulletin

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TECHNICAL INFORMATION CENTER • 8000 W. SUNRISE BLVD. • FT. LAUDERDALE, FL 33322 • (305) 475-6170

## PORTABLE PRODUCTS

SRN-964A

January 1987

APC - 258

## APCOR DUPLEXER SERVICE INFORMATION

<u>OLD P/N</u>	<u>NEW P/N</u>	<u>APCOR</u>
SP584140125	NLE8812A	12 Watt High Power
SP581988125	NLE8822A	1 Watt Lo Power

In response to numerous field inputs regarding testing and alignment of the above-mentioned duplexers, a two part program has been instituted to assure optimized operation of the customer's APCOR.

Part one of this program involves a factory offer of rebuilding (using some or all new parts, our option) duplexers deemed defective by field personnel, for a flat rate fee of \$350.00. This offer will only be honored on a one for one exchange basis and pertains to units beyond the standard one year parts warranty. Duplexers less than one year old and still within warranty will be repaired or replaced at no charge; however duplexers returned for warranty service that are found to require realignment only and have been adjusted by the requestor will be subject to labor charges for the realignment. National Parts has been instructed to refuse warranty parts replacement of duplexers and refer the requestor to Product Services, Florida.

Motorola, Inc.  
8000 W. Sunrise Blvd.  
Plantation, FL 33322

Attention: Product Services  
Phone: (305) 475-6173 or DiTel 522-6173

Part two of the program involves eliminating the necessity of field service-ability, from alignment standpoint, of the duplexer.

Product Services has setup a Service Depot which will be available for test and alignment of duplexers as well as complete APCOR service.

The complexity of unique test equipment utilized to accurately align and test the duplexer may not be cost justified on an individual shop basis.

Page 1 of 2

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.



As a further note of interest, the following is the general production process during assembly of the APCOR radio with respect to the duplexer. The duplexer, as a singular unit, is assembled, aligned, vibrated, mechanically shocked and retested. At this point, the tuning slugs are potted. The duplexer is then assembled into the APCOR which is subjected to various final and systems test procedures. At no time does the duplexer require or receive further adjustments to meet radio specifications. In short, the duplexers were designed to specific requirements and do not receive or require further tweaking for optimization within specific APCOR units.

Past experience has shown that a great many "duplexer problems" were due to inadequate ground connections between the coax and SMA connectors going to and from the duplexer. The connectors themselves must also be tightened securely to assure continuous ground paths. Battery replacement in the high power APCOR requires that care be taken to not pinch any of the coax's or cable groups.

The Service Shop address is as follows:

Motorola, Inc.  
Ft. Lauderdale Service Depot  
1739 N. W. 38th Avenue  
Ft. Lauderdale, FL 33311

Phone: (305) 475-5050 DiTel 522-5050

# bulletin

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## PORTABLE PRODUCTS

SRN - 969

APC - 230/232/411/422

June, 1982

## MODULE SUBSTITUTION ON NLN5874A DPL "B" DECK

The NLN5874A "B" Version Digital Private Line Deck used on MT and PT-500 portables contains a 51-5177D39 hybrid module which is no longer available. National Parts has been advised to substitute RPX4216A for this module. The kit includes a 51-5177D77 module, a capacitor and an RF choke to effect the modification.

The following components must be changed when installing a D77 module in a "B" version deck. Refer to Figure 1.

1. Remove C201, 1uF capacitor  $\pm 10\%$  20v.
2. Replace C201 with a 10uF capacitor (23-82397D03).


Note: Install this component on the solder side of the deck. Add #22 sleeving to both leads.

3. Remove L201 .29 uH RF choke.
4. Replace L201 with a .29 uH choke (24-82723H04) from the +7.5 Vdc land, termination point for the red/white wire to Pin 9 of U603.

Note: Install this component on the solder side of the deck. Add shrink sleeving on the choke and #22 sleeving to both leads.


Since the supply voltage is affected by the modification, the voltage will vary slightly on the individual modules. Refer to the tables below for module voltages.

VOLTAGE AND WAVEFORMS ENCODE/DECODE FILTER D77 (U603)

PIN NO.	DECODE	ENCODE
1	2.4 Vdc	2.2 Vdc
2	2.4 Vdc random noise @ 200 mV (1)	2.2 Vdc
3	-----	-----
4	2.4 Vdc low freq. random noise @ 400 mV (1)	2.0 Vdc
5	1.5 Vdc random sq. wave @ 1.5 V (1)	2.0 Vdc
6	2.4 Vdc low freq. random noise @ 400 mV (1)	2.0 ±.5 Vdc
7	2.4 Vdc low freq. random noise @ 400 mV (1)	2.0 Vdc
8	2.4 Vdc low freq. random noise @ 400 mV (1)	2.0 Vdc
9	7.5 Vdc	7.5 Vdc
10	3.5 Vdc	4.0 Vdc DPL code @ 8.6 V p-p
11	3.0 V  135 Hz @ 4.8 V p-p	2.4 Vdc DPL sq. wave @ 4.8 V p-p
12	0.0 Vdc	0.1 Vdc
13	0.0 Vdc	.1 Vdc
14	15 Vdc	0 Vdc
15	0.0 Vdc	.9 Vdc
16	0.0 Vdc	4.8 Vdc
17	6.2 Vdc	4.8 Vdc
18	6.2 Vdc	1.5 Vdc

(1) Indicates no carrier input.

DIGITAL PROCESSOR D40

PIN NO.	DECODE	ENCODE
1	3.0 Vdc	2.6 Vdc
2	----- 50 kHz @ 300 mV	----- 50kHz @ 300 mV
3	3 Vdc  135 Hz @ 4.8 V p-p	2.4 Vdc DPL code @ 4.8 V
4	0 Vdc 4.8 V @ detect	0 Vdc
5	-----	4.8 Vdc
6	2.4 V random sq. wave @ 4.8 V p-p	2.4 Vdc DPL code @ 4.8 V
7	-----	4 Vdc
8	-----	-----
9		
THRU		
17	0 Vdc or 4.8 Vdc depending on code	0 Vdc or 4.8 Vdc depending on code
18	6 Vdc	4.8 Vdc

# PHASE LOCK LOOP D38

PIN NO.	DECODE	ENCODE
1	0	0
2	0.7 (PL switch on)	0.8 Vdc (PL switch on)
3	0	0
4	6 Vdc	4.8 Vdc
5	3 Vdc random squares @ 1.5 V p-p	2.4 Vdc random squares @ 1.5 Vdc
6	.7 Vdc random squares @ 4.8 V p-p	.7 Vdc random squares @ 4.8 V p-p
7	2.4 Vdc	2.4 Vdc
8	-----	-----

This SRN is for information only and does not offer or imply any warranty consideration.



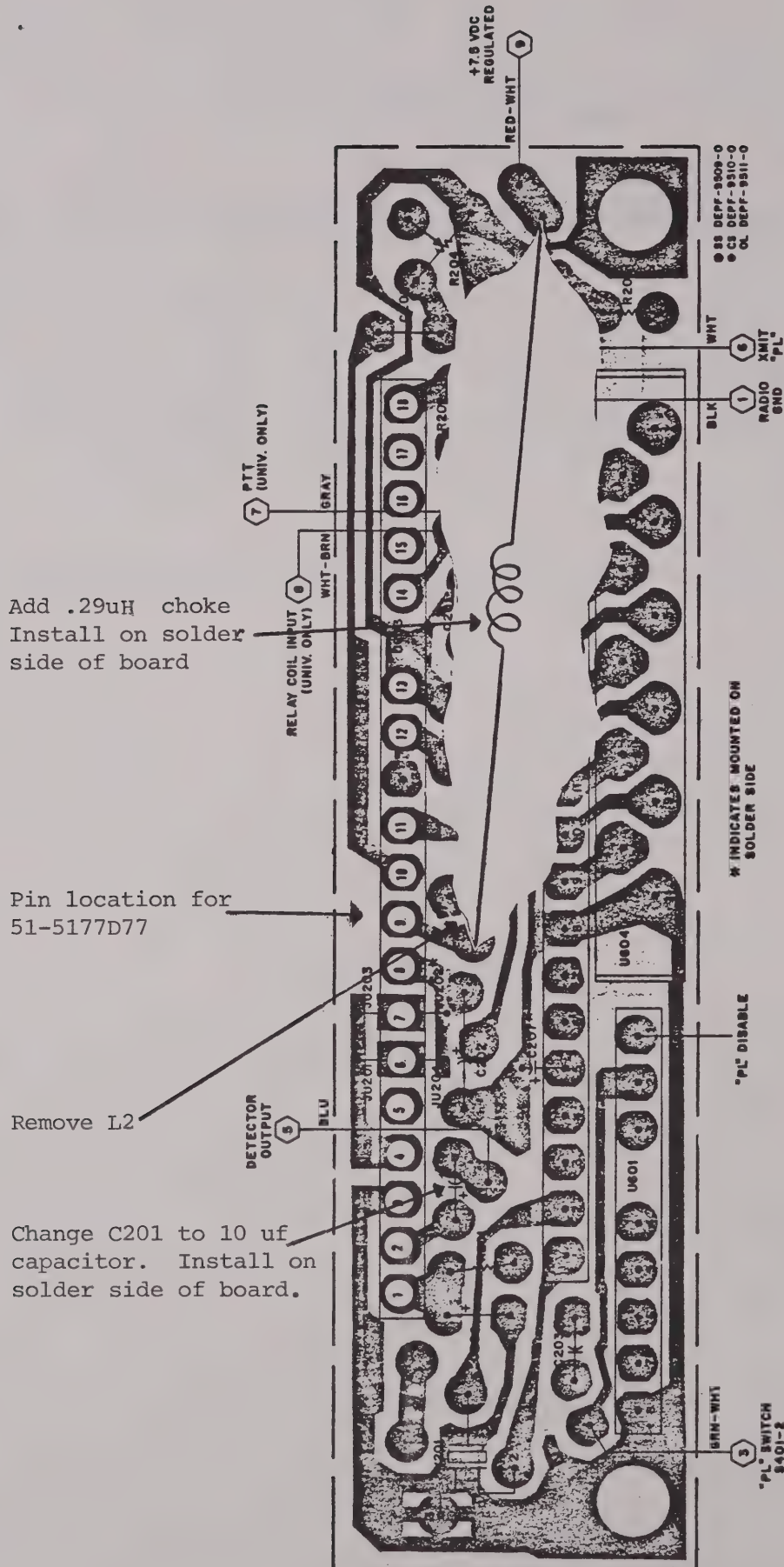


Figure 1



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# bulletin

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## ROUTING

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SRN-970

August, 1982

APC-438, 494

Deadline Date: 6/30/83

TITLE: POTENTIAL MULTIPLE SUBFLEET CABLE GROUNDING IN TRUNKING MOTRAR RADIOS.

MODELS AFFECTED: D25WLA5G00AK, L35WLB5170AM WITH B346 MULTIPLE SUBFLEET SELECT OPTION.

Recent field inputs have indicated there may be some Motrar radios with option B346 exhibiting a short from the cable to the front frame of the radio.

The affected subfleet switch kit assembly (TRN5113A P/O B346) consists of four ganged switches and an (8) conductor flat cable and connector. The barrel of the switches and cable pass through a small rectangular opening in the front frame of radio. This is the area where the potential cable shorting can occur.

The symptom of a shorted cable is an erratic subfleet selection for the operator. The operator will either not be able to select the proper subfleet or it will revert to a different subfleet.

In those cases where a failure is due to a cable shorting, a piece of electrical tape is sufficient to correct the problem. The bottom portion of the rectangular housing is where insulation is required.

All radios shipped with the B346 option after June 18, 1982 have added insulation between cable and frame.

Radios experiencing this problem can be repaired by an Authorized Motorola Service Shop with labor not to exceed 1/2 hour charged to warranty using standard warranty procedure until June 30, 1983. No charges will be accepted to visit customer installations.

Reference must be made to this bulletin including model and serial number for each order.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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\*Not User Price—Subject to change without notice.



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## ROUTING

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SRN-972

August, 1982

APC-495, 243

Deadline Date: N/A

TITLE: TANTALUM CAPACITORS INSTALLED WITH REVERSE POLARITY.MODELS AFFECTED: Trunked Syntor Series  
Motrar Radios

KITS AFFECTED: Common Circuits and Personality Boards

Recent field inputs have indicated that a potential problem (non-safety related) exists when tantalum capacitors are installed with reversed polarity.

The symptoms of the potential problem appear to range from various states of operational intermittents to conditions of total radio failure with time. Further incidents of this problem's symptoms appear to be heat related with warmer climates serving to accelerate the eventual breakdown of these reversed capacitors causing ultimate failure of the radio.

Some capacitors as received from vendors did not have uniform markings to denote the positive polarity and in some cases were vague or difficult to identify. As a result, capacitors are now on tape for automatic insertion which should resolve this potential problem.

This is a service aid bulletin. No charges will be accepted.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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## ROUTING

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SRN-975

October, 1982

APC-205

Deadline Date: N/A

TITLE: Multi-line terminals KDT240 Power Supply Failures  
Models Affected: D1118A/D1119A, DPL6009A

Field replacement of IC U14, P/N 51-84561L23 pulse width modulator must be made with P/N 51-84371K65. Replacement with the original part may result in power supply failure due to improper pulse width.

This is a service aid bulletin only. No charges will be accepted.

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## PORTABLE PRODUCTS

SRN 982A

APC 402, 432, 476, 477

422, 230, 411, 278

DEADLINE DATE: NONE

INFORMATION ONLY

## ANTENNA COLOR CODING

The following is a cross reference list of color codes for use in identifying various portable heliflex antennae. The antennae will have a paint dot on the bottom of the mounting stud and/or connector.

PRODUCT HT90, HT440APC 402, 432, 476, 477

<u>P/N</u>	<u>Model</u>	<u>Freq. Range MHz</u>	<u>Color Code</u>
85-5309N01	NAD6361B	136-142	Red
85-5309N02	NAD6362B	142-150.8	Yellow
85-5309N03	NAD6482A	150.8-156	Black
85-5309N08	NAD6483A	156-162	Orange
85-5309N04	NAD6364B	162-174	White
85-5309N05	NAE6331B	403-430	Yellow
85-5309N06	NAE6332B	440-470	Black
85-5309N07	NAE6333B	470-512	White
85-5777P01	NAE6340B (Whip)	403-512	None

PRODUCT MT500, HT210, HT220APC 230, 411, 422STANDARD MT500 LOWBAND ANTENNAE (12")

<u>P/N</u>	<u>Model</u>	<u>Freq. Range MHz</u>	<u>Color Code</u>
85-5195H01	NAB6001A	30-35	Yellow
85-5195H02	NAB6002A	35-40	Green
85-5195H03	NAB6003A	40-45	Black
85-5195H04	NAB6004A	45-50	Blue



EXTENDED RANGE MT500 LOWBAND ANTENNAE (15")

<u>P/N</u>	<u>Model</u>	<u>Freq. Range MHz</u>	<u>Color Code</u>
85-5195H05	NAB6032A	30-35	Yellow
85-5195H06	NAB6033A	35-40	Green
85-5195H07	NAB6034A	40-45	Black
85-5195H08	NAB6035A	45-50	Blue

VHF HT210 HT220 MT500 ANTENNAE

<u>P/N</u>	<u>Model</u>	<u>Freq. Range MHz</u>	<u>Color Code</u>
85-82283J05	NAD6221A	136-142	Yellow
85-82283J06	NAD6222A	142-150.8	Green
85-82283J01	NAD6219A	150.8-162	Black
85-82283J02	NAD6220A	162-174	Blue

UHF HT210 HT220 MT500 ANTENNAE

<u>P/N</u>	<u>Model</u>	<u>Freq. Range MHz</u>	<u>Color Code</u>
85-05146B03	NAE6100B	406-420	Red
85-05146B04	NAE6142B	440-470	Green
85-05146B05	NAE6163B	470-512	Black

PRODUCT MX300

APC 278

<u>P/N</u>	<u>Model</u>	<u>Freq. Range MHz</u>	<u>Color Code</u>
85-05491J01	NAD6282	136-150.8	Yellow
85-05491J02	NAD6283	150.8-162	Black
85-05491J03	NAD6284	162-174	Blue
85-05491J04	NAE6231	403-430	Red
85-05491J05	NAE6232	440-470	Green
85-05491J06	NAE6233	470-512	Black
85-05566A03	NAE6131*	403-430	Yellow
85-05566A04	NAE6132*	440-470	Green
85-05566A05	NAE6133*	470-512	Blue

PRODUCT HANDIE COM MH10, MH70

<u>P/N</u>	<u>Model</u>	<u>Freq. Range MHz</u>	<u>Color Code</u>
85-05563D08	NAB6225	30-50	None

Refer to HT/MT listing for VHF antennae for Handie Com.

This SRN is issued for information only and no warranty is offered or implied. Further information, if necessary, is available from Product Services, Florida (305) 475-6170

\* Used on Public Safety Microphones

# bulletin

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## ROUTING

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SRN-985

May, 1983

APC-205

Deadline Date: N/A

**METHOD OF REPAIRING BROKEN STEM ON KEY CAPS**

Models Affected: D1118A/B, 19A/B KDT-240 Keyboard Display Terminal

In response to field inputs, regarding broken stems under the key cap buttons on the KDT-240 keyboard and also problems associated with ordering replacements, Engineering has designed a universal plastic insert (Motorola part no. 38-84506M01) which will correct the problem of broken stems without replacing the actual button. The stocking of a small number of these inserts by the service shops will help them reduce or eliminate their inventories for the numerous alphanumeric characters used on this keyboard.

Use the following procedure for removing and repairing the key caps:

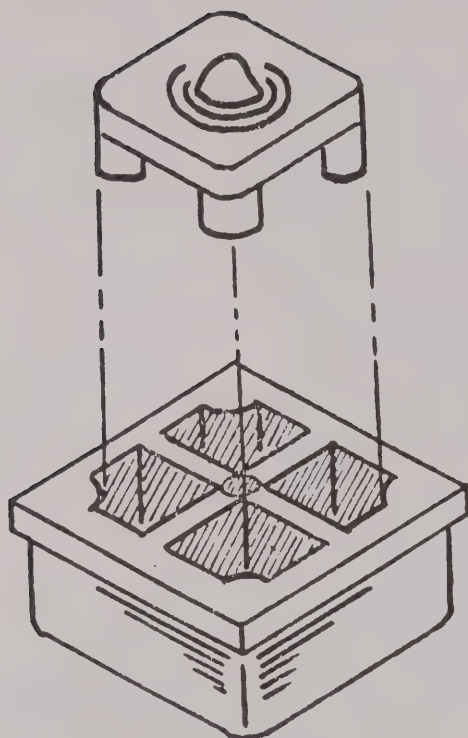
1. Remove the keyboard from the KDT by referring to the instruction manual 68P81036E90 under the maintenance section.
2. Place the keyboard face down on a flat surface, remove remaining screws, and lift off the back cover.
3. Remove defective key cap(s).
4. Prepare key cap for plastic insert by removing excessive mold flash from the four cavities (see attached pictorial). NOTE: If flash is not removed, the insert may not seat properly and could cause continual activation of the contact.
5. Insert the plastic insert in key cap and replace key cap cover.
6. Assemble keyboard to the KDT and make sure all keys work properly.

(Over)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.



← ELASTOMER INSERT  
38-84506N01

← KEYCAP BUTTON

The elastomer plastic insert, part no. 38-84506N01 is available from Motorola C & E Parts at a cost of \$1.25 each.

**NOTE:** Please keep a copy of this SRN bulletin in your KDT-240 instruction manual for future reference.

This is a service aid only. No parts or labor costs will be authorized by the plant product group.

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## ROUTING

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SRN-994A\*\*

April, 1984

APC-484

Deadline Date: 12/31/84

SUBJECT: BLANK OR CONSTANT LED DISPLAY ON THE "MCX100" MOBILE RADIO

MODELS AFFECTED: MBD23/MBD43CUA Series Front Mount, and  
 MBT23/MBT43CUA Series Remote Mount, with  
 MBB422/423 Series Channel Scan Option

There is a possibility that certain field conditions may cause failure of integrated circuits in the Display Buffer Board. The circuits affected are U4101 and U4102 in the MBTRN4688A/MBTRN4689A Display Buffer Board for front mount radios and U4601 AND U4602 in the MBTRN4771A/MBTRN4689A Display Buffer Boards for remote mount radios.

The engineering solution is to put a 1K ohm resistor in the VSS lead of these integrated circuits. Because the modification is rather difficult to implement, a new board, with the modification installed, can be procured from C & E Parts Department until 12/31/84 at no charge by referencing this bulletin number, along with serial and model number of radio. Please order and specify kits as follows:

9 Channels Remote Mount - Order MBTRN4771A  
 16/32 Channels Remote Mount - Order VLN1040A  
 9 Channels Dash Mount - Order MBTRN4688A  
 16/32 Channels Dash Mount - Order VLN1041A

**NOTE:** VLN1040A kit includes MBTRN4771A plus MBTRN4689A.  
 VLN1041A kit includes MBTRN4688A plus MBTRN4689A.

Since only a small portion of these scan units are affected, only those that are exhibiting this problem should be changed.

Radios experiencing this problem can be repaired by an authorized Motorola Service Shop with labor not to exceed 1/2 hour charged to warranty using standard warranty procedure and referencing this bulletin until 12/31/84.

Units shipping from the factory after 4/22/83 include the modification.

**\*\* Supersedes and invalidates SRN-994 issued June, 1983.**

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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## ROUTING

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SRN-1001

August, 1983

APC-N/A; General

Deadline Date: N/A

APC-201

**PRECAUTION IN SERVICING TRUNKED REPEATER, REPEATER, AND BASE STATIONS**

This bulletin is a reminder to all technicians servicing Trunked Repeater, Repeater, or Base Stations to disable the station transmitter before working on the station.

This is especially important when servicing Trunked Repeater Stations because its transmitter is ON under failsoft control.

**WARNING**

Whenever any work is performed on Trunked Repeaters, Repeaters or Base Stations, *ALWAYS* actuate the station control module's LINE DISABLE switch. By actuating the LINE DISABLE switch, the station will not key, even if the station is under failsoft control (Trunked Repeaters only).

There are three switches on a standard station control module; XMTR switch S1, LINE DISABLE switch S2, and PL DISABLE switch S3. To prevent the transmitter from being remotely keyed, or the occurrence of an unexpected transmitter turn ON while servicing the station, be sure that the station control module's LINE DISABLE switch S2 is actuated (set to the right, in the direction of arrow) and the DISABLE lamp DS1 is lit (Green).

**NOTE**

DS1 will light if either S1 or S2 is actuated.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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## ROUTING

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SRN-1002

August, 1983

APC-N/A; General

Deadline Date: N/A

**SUBJECT: SECURE COMMUNICATIONS EQUIPMENT DEVIATION ADJUSTMENT  
AND MEASUREMENT FOR DES AND DVP™ RADIOS**

**I. Purpose**

The purpose of this memo is to describe in some detail how to measure and adjust the transmitter deviation for both *DVP* and *DES* radios in the private mode. Exactly how the deviation should be measured and what it should be are covered. Briefly, the deviation should be set to 4 kHz and should be measurable to within a 200 Hz tolerance with equipment that is available today.

**II. Good Measurement Technique**

The measurement of the transmitter deviation in the private mode basically reduces to the measurement of the deviation of the eye pattern for the encrypted audio. Because the encrypted audio spectrum extends from 0 Hz (dc) to 6 kHz an accurate measurement requires good response in the measuring instrument over this entire frequency range. On the low end it is acceptable if the instrument responds down to 5 Hz but it is better and easier to measure the deviation if the response extends to dc. On the high end the response is dominated by the bandwidth of the i-f in the measuring instrument. Some instruments have both a wide and a narrow i-f while others have a fixed i-f. When given a choice the wide i-f is usually appropriate. Some instruments have a D'Arsonval meter with damping that is calibrated to read the deviation. On such instruments the meter will frequently vary in a random manner about 200 Hz around some mean value. The best way to measure the deviation in that case is to average out the meter fluctuations to estimate the deviation. On most instruments it is possible to display the transmitter waveform on a CRT display. In such instruments the display is usually calibrated and the measurement consists of determining the peak amplitude of the eye pattern. If the instrument is dc coupled the deviation is easy to determine. If it is ac coupled then the eye pattern will randomly move vertically on the CRT and the measurement consists of trying to determine the peak amplitude of the eye pattern envelope while ignoring the low frequency vertical excursions caused by the ac coupling.

**III. Specific Instruments**

The methods to measure deviation on 5 different instruments will be covered here. This section applies the principles outlined above to each instrument.

(over)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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### 1) HP8901A Modulation Analyzer

This instrument is a precision receiver that can measure deviation. There is a provision for several internal high pass and low pass filters and the safest way to handle them is to turn them all off. There is also a provision for a de-emphasis filter and that should be turned off. The deviation reading may be either a peak or average reading and either peak+ or peak- should be used. The digital readout will then display the deviation in kHz when the fm function is selected. The deviation readout will tend to randomly fluctuate due to internal ac coupling so several readings should be averaged together to estimate the actual deviation. If an external scope is to be used to monitor the eye pattern then the scale may spontaneously change a factor of ten due to the automatic scaling that is done in the instrument. This may be fixed by using the special select code 2.2 (i.e. press "2,2 SPCL").

### 2) Marconi 2305 Modulation Meter

This is a precision receiver that is intended to compete with the HP8901A model. There are some additional features that are of no concern here. Essentially the method of measurement is the same as for the HP8901A model. The high pass/low pass filter selection should use the lowest frequency coupling possible. The de-emphasis should be turned off. Noise averaging should be used to minimize the effects of instrument noise. The reading is then displayed on one of the LCD displays. Because of instrument noise the meter will tend to indicate about 500 Hz more deviation than is actually present.

### 3) Motorola Rack Receiver

This instrument is an old precision receiver that is now obsolete. It is included here to be thorough. This receiver has to be calibrated by driving one of the ports with a large (1 volt is appropriate) 1 kHz sine wave. The Normal/Invert-/Non-invert switch should be set to either the Invert or Non-invert position. The Dev/Rcvr switch should be set to Dev in order to adjust an external scope for the calibrated deviation. The deviation switch should be set for 5 kHz before the scope is calibrated. With this setup the scope should display some sort of 1 kHz square wave. By adjusting the calibration of the scope input attenuator the waveform may be adjusted for 5 divisions on the CRT. The scope should be dc coupled. Now when the Dev/Rcvr switch is set to Rcvr the rack receiver will display the demodulated eye pattern. Because the output is dc coupled it is a very accurate means of measuring the deviation. The eye pattern should show 4 divisions between the peaks of the eye pattern and this represents 4 kHz of deviation.

### 4) RI200 Service Monitor

This is an older instrument with both a receiver and a generator that is capable of measuring deviation. The deviation may be measured with either a small CRT that is calibrated in kHz or a small meter that essentially responds to the same waveform as the CRT. With the wide band mixer plug-in the i-f should be set to

"wide" for accurate measurements. The scope should be dc coupled if used. On the scope the peak excursion of the eye pattern should be aligned with the 4 kHz calibration. If the meter is used then the readings should be averaged to estimate the actual deviation.

#### 5) R2001 Communications Analyzer

This is a newer instrument that is intended to measure nearly every parameter of a radio that is relevant in a service shop. To measure deviation the "wide" i-f should always be used to reduce the distortion of the eye pattern. The eye pattern deviation should be read from the CRT display with the calibrated graticule. The bar graph display is not as accurate. To measure the deviation the set-up consists of selecting the Power Monitor or Monitor position on the function switch and the Modulation position on the display selector. The peak of the eye pattern should read 4 kHz - averaging out any noise "fuzz" on the eye pattern waveform. This measurement can be done in the full duplex mode.

#### 6) R2200 Communications Analyzer

This is a new instrument that is intended to be similar to the R2001 model but without the frequency memory and full duplex features of the R2001 model. Very similar techniques are used for the two instruments. To measure deviation the "wide" i-f should always be used to reduce the distortion of the eye pattern. The eye pattern deviation should be read from the CRT display with the calibrated graticule. The bar graph display is not as accurate. To measure the deviation the set-up consists of selecting the Power Monitor or Monitor position on the function switch and the Modulation position on the display selector. The peak of the eye pattern should read 4 kHz - averaging out any noise "fuzz" on the eye pattern waveform.

### IV. Specific Radio Deviation Adjustments

Each of the current *DVP* radios will be discussed here in order to describe how the deviation is to be adjusted. The intention is to get as close to 4 kHz as possible and to minimize the eye pattern distortion on dual port modulators (i.e. most Motorola synthesized radios). The deviation tolerances are also listed here and it should be understood that the tolerance includes the precision of the measuring instrument as well as the make tolerance of the radio and the margin for splatter protection.

The MX '300™ series of portable radios have no deviation adjustment specifically for *DVP*. Private mode deviation is determined with fixed value resistors and laser trimming on the transmit channel elements (or offset oscillators in the case of uhf MX 300 portables). The tolerance is -250 Hz/+500 Hz.

The MX 300-S™ synthesized portables have a small pot on the solder side of the mother board that sets the deviation in the private mode. The tolerance is  $\pm 250$  Hz.

The MCX 100™ mobile has 2 pots on the *DVP* board that set the deviation for the synthesizer and the drive for the reference oscillator. The synthesizer pot will dominate the deviation adjustment. The tolerance is  $\pm 400$  Hz. The reference pot will reduce eye pattern distortion by setting the deviation of the reference oscillator at low frequencies equal to the deviation of the synthesizer at higher frequencies. Due to deviation limitations of the reference oscillator the reference pot should not be set for more than 2 volts peak drive to the reference oscillator even though this is less than optimal in vhf models. In uhf models this will not be a constraint. When the reference pot is adjusted the eye pattern from the modulation meter should be viewed on a scope and the vertical fluctuations or jitter should be minimized. The precision with which this pot may be adjusted is sensitive to the low frequency response of the modulation meter. It will also have a small effect on the accuracy of the synthesizer pot adjustment so that both pots may have to be touched up whenever one is adjusted.

The SYNTOR™ mobile has one pot on the *DVP* board that adjusts deviation in the private mode. The tolerance is  $\pm 250$  Hz. The modulator is a 2-port like the *MCS 100* and the reference pot should be adjusted for the best eye pattern by minimizing the vertical fluctuations or jitter of the eye pattern waveform. As in the *MCX 100* the accuracy of the adjustment of the reference pot is determined by the low frequency response of the modulation meter. It also has a small effect on the synthesizer deviation reading so that both pots may need to be touched up if one of them is adjusted.

The SYNTOR X™ mobile should be adjusted the same as the *SYNTOR* radio.

The Micor™ station/repeater *DVP* deviation is fixed by factory selected resistors on the Code Processor module. The transmitter deviation in the standard mode is set in the factory by adjusting the *I.D.C.*™ pot for 4.75 kHz of deviation on a 1 kHz tone driven well into clip in the *I.D.C.* circuit. The tolerance on *DVP* deviation is -500 Hz/+0 Hz. The adjustment of *DVP* deviation on the standard Code Processor module is done by changing the value of R47. That value should range from 10k ohm to 0 ohm. On the Full Duplex Code Processor modules (QLN2194A and QLN2753A) the *DVP* deviation is adjusted by changing the value of R23 or R300. R23 will adjust the deviation of data to be transmitted from the line. R300 controls the deviation of repeated data directly from the receiver. These values are adjustable from 10k ohm to 0 ohm.

The older *Micor* mobiles have a single pot on the Voice Protection board that sets the deviation in private mode. The tolerance is  $\pm 250$  Hz.

The Portable Repeater has a single pot on the main control board that sets the deviation in private mode independent from the deviation in the standard mode. The tolerance on private mode deviation is -250 Hz/+500 Hz.



## V. Performance Degradations

This section will cover the degradations in a system caused by improper deviation adjustment. They are relatively minor if the deviation is set within a 10% tolerance ( $\pm 400$  Hz).

When deviation is set too low the main problem is loss of sensitivity in the private mode. Measurements on *Micor* mobiles and MX portables indicate that a few dB of sensitivity (for 1% bit error rate) is lost if the transmitter deviation falls to 3 kHz. Below 3 kHz the degradations are much more serious. In *Micor* mobiles and stations the hysteresis limiters begin to fail while in all other equipment the cross-over jitter increases. These will cause the receive *DVP* detector to drop out and the radios will fail to unsquelch properly in the private mode.

When deviation is set too high the main problem is that adjacent channel splatter protection decreases below the 60 dB limit. The cost is several dB of splatter protection (measured by the EIA companion receiver method at 25 kHz) if the deviation increases to 5 kHz. The amount of excess deviation that is allowed beyond the 4 kHz specification while still making 60 dB of splatter protection depends on the radio and the transmit eye opening. Above 5 kHz of deviation the degradation is even more severe. Most *DVP* receivers will begin to distort the eye pattern so much that the sensitivity is impaired. The off-channel performance will also be degraded because the occupied bandwidth will begin to increase beyond the capacity of the receiver i-f filter.

This is a service aid bulletin.





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# bulletin

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## PORTABLE PRODUCTS

SRN - 1003

July, 1983

APC 230/411/422

DEADLINE DATE: July 31, 1984

## NEW TOUCH CODE PAD FOR THE MT500 PORTABLE

A new touch code pad has been designed and should be installed whenever a portable equipped with touch code comes in for maintenance. This pad has carbon filled contacts which replaces four parts on the front cover. Refer to Figure 1. The new pad, (Part #75-5902K01) is a drop-in replacement, no modification need be made to the radio except the ones called out in the following instructions.

Procedure for Replacement of Touch Code Pad:

1. Disassemble radio per service manual.
2. Remove the (4) hex nuts holding down the circuit board in the front cover.
3. Unsolder the red and the black wire from the battery straps.
4. Carefully lift out the circuit board.
5. Remove the (4) hex nuts holding down the contact board.
6. Refer to Figure 1. The new pad (P/N 7505902K01) will replace the contact pad (P/N 3905425H01), the spacer key (P/N 4305424H01), buttons (P/A3805430H01), and the old pad (P/N 7505426H01).
7. Clean the gold plated contact board with alcohol to remove foreign material that may impede the performance of the new touch code pad.
8. Remove items in step 6, and place new pad (P/N 7505902K01) into position.
9. Install the contact board by reversing procedure in step (5).
10. Install the circuit board by reversing procedure in step (2).
11. Add a drop of Glyptal to each of the (4) hex nuts holding down the circuit board.
12. Solder the red and the black wires to the battery straps.
13. Reassemble radio per service manual to complete the modification.

Page 1 of 2

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

The new pad is available from your local parts department free of charge by referencing this bulletin and the serial number of the portable on which it is to be installed. No labor is being offered.

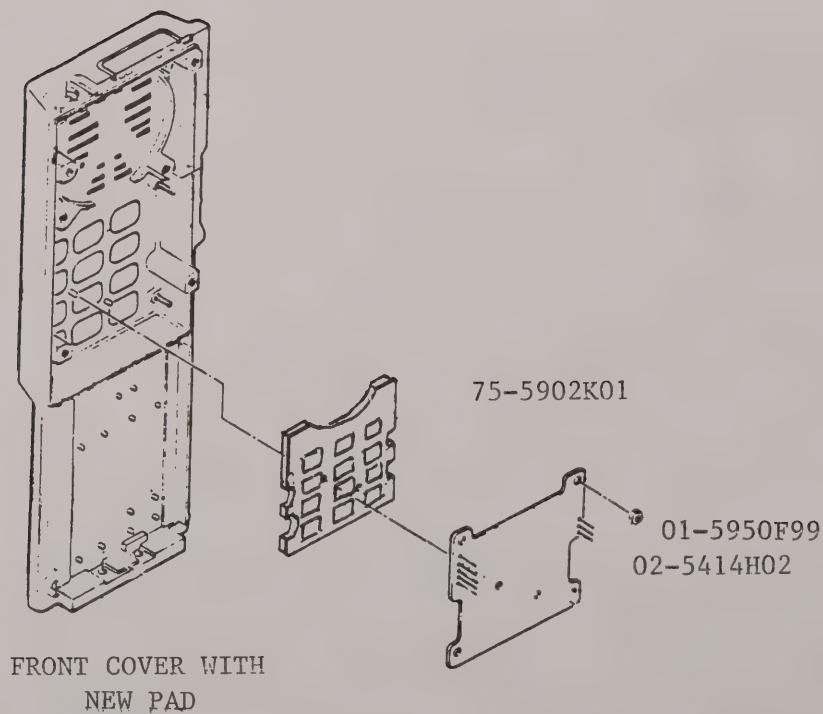
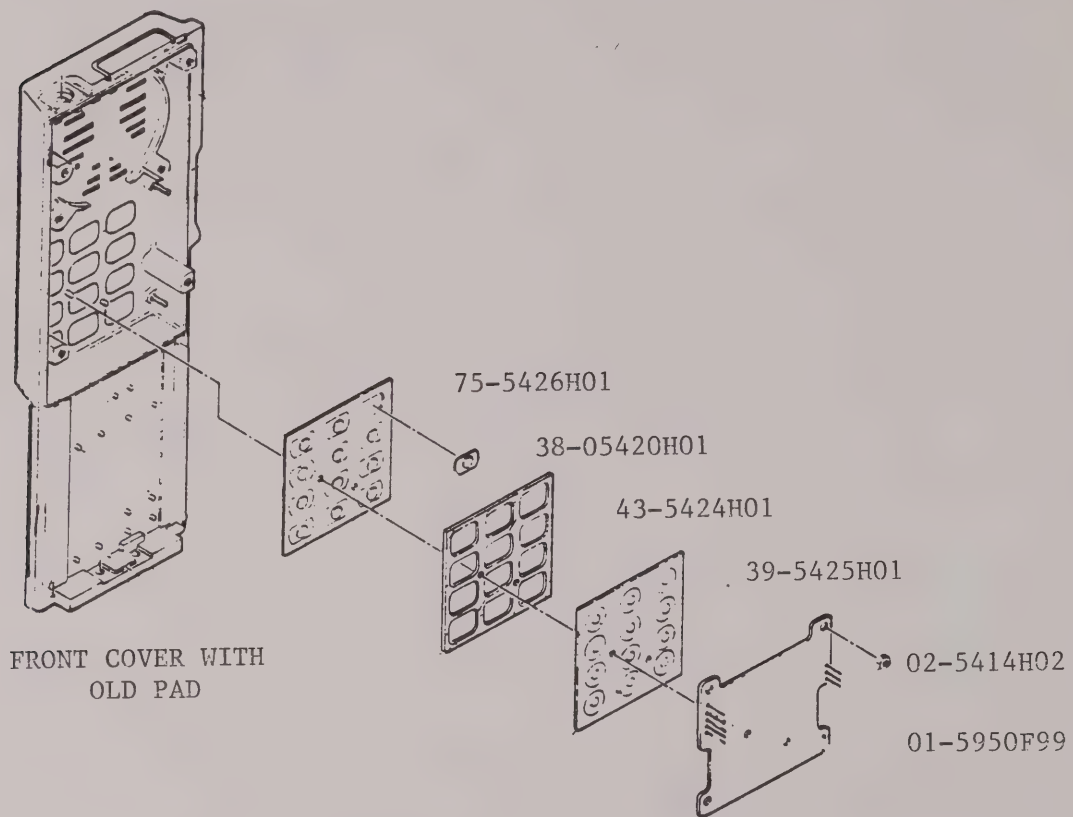


Figure 1

# bulletin

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## ROUTING

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SRN-1004

September, 1983

APC-N/A; General

Deadline Date: N/A

Subject: **CAUTION** Requirement for Test Equipment Products

Model Affected: S1053 AC Voltmeter  
S1063 DC Multimeter  
S1067 Audio Oscillator

A potential safety hazard exists regarding the improper use of line cords on the above test equipment products.

The 117 V ac line cord used on the S1336B Supervisory Test Set for IMTS radios can be plugged in to our S1053, S1063 and S1067 power cord socket. These products are designed to operate at a lower input voltage so their power cords contain a built in step down transformer which also provides line isolation. By plugging in the power cord from the S1336, full line voltage is introduced to these products. This situation can cause operator injury or damage to the equipment. The S1053, S1063 and S1067 products are now shipping with a **CAUTION** label located adjacent to the power receptacle to discourage such improper use of the line cord.

**CAUTION** labels for any units already in use may be obtained free of charge by ordering part number 54-80313B32 from C&E Parts. A sample of this label is attached.

**CAUTION**

**DO NOT OPERATE  
THIS UNIT DIRECTLY  
OFF LINE VOLTAGE.**

This unit uses a low voltage  
power adapter. Refer to  
manual for use of proper  
adapter.

54C80313B32

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Not User Price—Subject to change without notice.





# bulletin

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## ROUTING

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SRN-1005

October, 1983

APC-409, 509, 537

Deadline Date: N/A

SUBJECT: FIELD SERVICING EIMAC FINAL POWER AMPLIFIER &amp; CAVITY

MODELS AFFECTED: 806-866 MHz Micor™ Base and Repeater Stations C75RCB Series

KIT AFFECTED: TLF1073A Final Power Amplifier

The following information should be used as a guide when performing routine or emergency maintenance on the tube cavity which is part of the TLF1073A Final Power Amplifier. It is recommended that regular scheduled maintenance be performed on an environment/usage basis.

The manufacturer, Eimac, has recommended a procedure for field servicing the TLF1073A Power Amplifier Cavity Assembly. This details tube removal, tube and cavity cleaning and tube insertion procedures. The manufacturer also recommends that the PA be removed from the station and placed in a U-shaped wooden holding fixture, see figure 1. This will re-orient the PA into a horizontal plane for ease of servicing. In those cases when the PA removal is not possible, the Eimac servicing procedure should be followed as closely as possible with the PA racked in the station.

For base stations shipped prior to September 1, 1979, an intermittent tuning problem was found in some 800 MHz Power Amplifier Cavities. Symptoms are erratic tuning, primarily of the input, and intermittent and varying power output due to high input VSWR. The problem is caused by an intermittent connection between the tube grid and cavity. The intended connection is between the finger stock and tube. The intermittent contact occurs between the base of the tube and cavity housing, causing the input to become detuned. To correct this condition, install an insulator (Part No. 14P83328L36) between the tube base and cavity. The ring should be slipped in place under the grid finger stock without removing the grid finger stock. The finger stock will hold it in position.

EIMAC PROCEDURE

Item numbers are shown on Motorola Parts Location Detail PEPS-22098-B in Motorola Manual 68P81031E45 (behind TRANSMITTER tab and in the FINAL POWER AMPLIFIER section).

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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\*Net User Price—Subject to change without notice.

I. TUBE REMOVAL - (CAUTION: Do not mix hardware. Re-assemble using same hardware from original slots)

- 1) Remove all voltages from the cavity, Motorola Model TLF6063A Tripler and Doubler, and station.
- 2) Disconnect the three power cables and coaxial cables from the driver and to the antenna or any auxillary power measuring device.
- 3) Disconnect and remove blower and cover.
- 4) Remove power amplifier panel (Motorola Model TLF1073A) from transmitter cabinet and place on stand (see figure 1) with output side of unit face-up.
- 5) Examine the three power receptacles J8, J12, J900 and plugs P8, P12, P900 for broken or misaligned pins. Replace or repair as required.
- 6) Remove protective cover over Control Logic Board (Motorola Model TRN6588A) and potentiometer R900. Clean area of dust and inspect and tighten connections. Repair as necessary. Replace cover.
- 7) Remove cap from tube anode (V901). If desired, the slot-head set screw may be replaced with equivalent Allen screw for easier removal and replacement of cap.
- 8) Remove circular phenolic anode clamp ring (Item #32) held in position by six screws with lockwashers.
- 9) Position tube puller (Motorola Part No. 0180793B17, or equivalent) with the lifting fingers under the top cap of the tube. It is essential that the puller remain parallel to the surface of the cavity during tube removal. (See Figure 3, page 4 of FINAL POWER AMPLIFIER SECTION of Motorola Manual 68P81031E45).
- 10) With the tube puller in place, pull slowly on the handle with the right hand while guiding the tube as necessary with the left hand. Do not twist the tube during removal and do not allow it to "bump" the finger stock. Note that the anode collet (Item #31) will still be on the tube anode heat exchanger as it comes free of the cavity. The anode bypass capacitor ring (anode insulator, Item #34) remains on the cavity.
- 11) With the tube and anode collet assembly free of the cavity, hold the collet in two hands with the plate cap of the tube facing you.
- 12) Press the anode with your thumbs evenly, so the tube slowly passes through the collet. Guard the tube so it does not drop out of the collet and become damaged. Place tube and collet to one side.

- 13) Remove the anode bypass capacitor ring from the cavity. Clean the dust from it with a mild solvent (denatured alcohol or acetone, for example) and examine for punctures or cracks in the copper or the Kapton<sup>™</sup>. Look for signs of water condensation or discoloration. Replace the ring if necessary due to damage or permanent discoloration. If a new bypass capacitor is used perform the above cleaning procedure on the capacitor before installing it into the cavity.
- 14) Examine the anode collet (Item #31). Clean dust from it with a small brush. If any fingers are missing or bent, replacement of the assembly must be made as cavity power output and tuning may be affected.
- 15) Clean the surface of the cavity under the anode collet assembly with denatured alcohol or acetone.
- 16) Remove the four screws and lockwashers that hold the grid collet assembly (Item #26) to the lower cavity plate. Remove the collet and clean the dust from the fingers with a brush and denatured alcohol or acetone.
- 17) Blow the dust from the interior of the cavity. Small cans of pressurized clean air can normally be obtained at most photographic stores. Carefully clean the cavity inner surface (particularly around the input and output coupler mechanisms) with a soft brush dipped in denatured alcohol or acetone.
- 18) Examine the filament contact ring and clean with pressurized air. Replace contact ring if fingers are broken or bent (Item #8, Item #10).
- 19) Reinstall the grid collet assembly (Item #26).

NOTE: It is very important that the grid collet assembly be aligned properly with the tube grid contact ring. Improper alignment will result in broken finger stock and uneven contact pressure on the tube ring.

To align the grid collet assembly mount the collet on the lower cavity plate however do not tighten the four mounting screws. After the assembly is loosely mounted, carefully insert the tube into the socket making sure the tube is properly seated. This will align the grid collet assembly. Using a dial type screwdriver tighten the four mounting screws and lockwashers on the grid collet assembly. Carefully remove the tube straight away from the socket avoiding any twisting or bending motion.

- 20) Turn the amplifier panel over on the stand so the input side is face-up.
- 21) Remove the blower filters, clean and reinstall according to the procedure outlined in paragraph 4.2, page 4 of FINAL POWER AMPLIFIER section of Instruction Manual.



- 22) Remove the input cover plate (Motorola part no. 15B82307L-01) of the cavity by loosening the six captive Allen screws in the plate.
- 23) Blow away any loose dirt from the input area under the plate. Inspect and tighten the filament connections on the side of the assembly and tightened, if necessary.
- 24) Check the three bolts around the circumference of the cavity contact assembly (Item #8) for tightness.

NOTE: These bolts should be tight enough to compress the lock-washers. If excessively tight, the compressive force may puncture the *Kapton* dielectric in the heater-cathode assembly.

- 25) The center bolt of the cavity contact assembly should be checked for tightness.
- 26) Re-install the input cover plate which is held in position by the six captive Allen screws.
- 27) All bolts around the perimeter of the cavity and center contact assembly should be check for tightness.

#### TUBE CLEANING PROCEDURE

NOTE: If the original tube is to be re-used, the cavity must be inspected and cleaned before insertion.

- 1) The anode collet should be round with no dents or serious indentations as this will lead to poor contact with the fingerstock of the anode collet.
- 2) The anode cooling fins should be free of dust and dirt. The fins can be cleaned by immersing the tube anode in a solution of warm water and TSP (TRISODIUM PHOSPHATE). Methanol may be used as a subsitute for the TSP. After cleaning, the anode should be rinsed thoroughly and blown free of moisture.
- 3) When the tube is dry, the outer anode ring (especially the area contacted by the anode collet) should be cleaned with a light abrasive such as Scotch Brite-Pad™ (green).
- 4) The ceramic envelope cylinder between the plate and grid should be cleaned with a cloth moistened with water and TSP, and rinsed with clean water to remove any TSP residue.
- 5) The grid contact ring should be cleaned with a light abrasive such as Scotch Brite-Pad™ (green). After cleaning, it should be rinsed with warm water and dried.

- 6) Dust and dirt should be blown clear of the heater and cathode rings.
- 7) Before re-assembly, check all internal surfaces, especially in the by-pass ring area for any damage which may have occurred during disassembly, such as burrs or sharp edges.

#### TUBE INSERTION

NOTE: Before performing the tube insertion procedure, assemble the anode collet (Item #31) and the phenolic anode clamp ring (Item #32). The collet should fit in the phenolic ring with enough edge clearance to permit the collet to float after assembly.

- 1) Place the tube on a flat surface, sitting on the plate cap.
- 2) The anode collet (Item #31) is positioned by hand above the tube, flat side up, and gently and evenly pressed onto the tube. Continue pressing until the collet has moved about three-quarters of the way down the anode structure. The collet should be parallel to the surface on which the tube is resting.
- 3) Place the anode bypass capacitor (anode insulator, Item #34) on top of the cavity opening. Center it between the screw holes. It is important that the capacitor remain centered during the tube and anode collet assembly procedure. Misalignment will result in a short circuit condition to exist when the high voltage is applied to the tube anode. To secure the ring during assembly use Scotch™ tape. The tape should be applied only to the outermost edge of the capacitor and may remain after assembly is completed.
- 4) Make sure the Kapton™ grid insulating ring is in place within the grid collet. Pick up the tube and collet assembly and, holding the tube by the plate cap, insert the assembly into the cavity which is sitting in the stand. Direct the tube base at the center heater contact assembly (Item #8).
- 5) Gently and firmly press the tube into the cavity until it bottoms. Use a straight-in pressure and do not rock the tube or use any twisting motion. It is important for the tube to be fully seated so that overall contact with the grid collet is assured.
- 6) Recheck proper alignment with the anode capacitor (anode insulator, Item #34) under the anode collet (Item #31). Press collet and capacitor against cavity wall. Check to see if the capacitor is still centered and align if necessary.

- 7) The collet and tape will hold the capacitor in position while the phenolic anode clamp ring (Item #32) is positioned and fastened in place with the six screws and lockwashers. Attached the cap to the tube anode.
- 8) Re-install the power amplifier in the transmitter cabinet. Also the blower and cover. Reconnect all cables to the amplifier.
- 9) Perform the entire tuneup procedure as outlined in the Motorola Instruction Manual.

This is a service aid bulletin. No charges will be accepted.

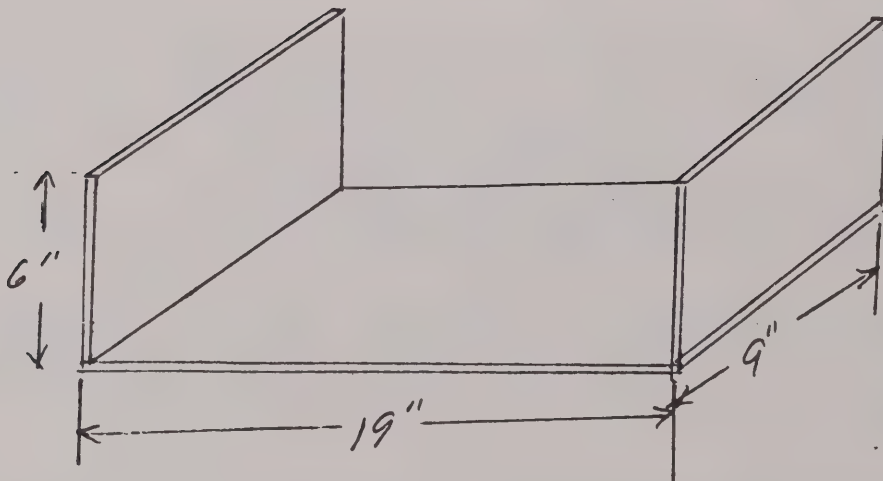


Figure 1. Holding Fixture



# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## ROUTING

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SRN-1010

December, 1983

APC-203, 539

Deadline Date: N/A

SUBJECT: Intermittent spurious emission when transmitting; also, receiver desensitivity in EMS units with duplexer.

MODELS AFFECTED: All UHF Micor™ Mobile Radios including EMS Duplex/Repeater Q2033A-35A.

KITS AFFECTED: TLE8061A-75A Low Level Amplifiers

Several field inputs indicate a reoccurrence of an old soldering problem with the UHF *Micor* Low Level Amplifier.

The problem is indicated by either the transmitter emitting spurious emission, or receiver desensitivity in the case of EMS units where the radio has a duplexer.

If either of the two problems are experienced, inspect the low level amplifier for a loose coax shield ground. This is the solid coax going to P501. If the shield is found loose, resolder to edge of microstrip.

This is a service aid only.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

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# bulletin

● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-1011A

June, 1984

APC-213

Deadline Date: 9/30/84

AUDIO DISTORTION IMPROVEMENT FOR *PULSAR* MOBILE RADIOTELEPHONES

MODELS AFFECTED: T1837D, T1877D, T1886BA/BB, TCN1233C, TCN1235C  
TCN1245B, TCN1354B, TCN1353B

OPTIONS AFFECTED: T386AA/AB

A recent investigation by the plant indicates that some improvement in audio distortion can be obtained on the TSN1004A Speakers shipped between May 10, 1983 and September 15, 1983.

There are two external speakers available for the *PULSAR* mobile phones. The TLN1877A, 3-watt system is recommended for faithful audio reproduction such as required for *V.S.P.* operation or in those applications where extensive audio monitoring at high volume levels is required. The TSN1004A, 1-watt system is recommended for monitoring dial tone, ring tone, or other on-hook call processing functions and limited audio monitoring at relatively low volume levels where intelligibility is of limited importance. The TLN1877A is supplied with *V.S.P.* equipped mobile phones and is available as an option if required. The TSN1004A ships with the standard *PULSAR II* control head.

It has been determined that the optimum value for R3 in the TSN1004A is 2000 ohms. A noticeable improvement should occur if R3 is found to be 910 ohms and changed to 2000 ohms. Changing from the original 2200 to 2000 ohms will produce no noticeable change.

It is not recommended that this resistor be changed on units being used for an on-hook call processing only, or units being used for occasional audio monitoring. In severe situations, when the customer is operating the mobile phone in a noisy environment and monitoring audio extensively, a TLN1877A should be recommended and installed. Mobile phones should not be recalled specifically for this improvement.

If this improvement is required for TSN1004A Speakers shipped between May 10, 1983 and September 15, 1983 labor not to exceed 1/2 hour by an authorized Motorola Service Shop can be charged to warranty using the standard warranty procedure.

The 2000-ohm resistor Part No. 6-11009C56, (10 per pack) can be obtained at no charge until September 30, 1984 thru you local Motorola Parts Office.

Reference must be made to this bulletin, including model and serial numbers for each order.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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## ROUTING

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SRN-1012

December, 1983

APC-702

Deadline Date: N/A

SUBJECT: POSSIBLE SHOCK HAZARD FROM SWITCHING POWER SUPPLY  
VP20004A/0122012A19

MODELS AFFECTED: 220 V UVT-14 Universal Control Terminal Q2338B, Q2368BA  
220 V IDP-30 Identification Processor QDN6224A, QDN6225A  
110/220 V GSP-50 General Status Processor Q2436B, Q2380BC,  
QDN6213A, QDN6214A, QDN6441A

Lethal voltages are present on the printed circuit board and various components within this power supply. The possibility of accidental contact with these exposed areas exists when access panels or covers are removed for servicing.

It is recommended that both warning labels (Part No. 54-84119B01 and 54-83379A01) be placed on the rear cover of the desk top units, and also on the solder side of the power supply printed circuit board of console mounted units.

These labels can be obtained from C&E Parts at no charge by referencing this bulletin and serial numbers of the units.

No labor or installation cost are authorized since the labels should be applied during the first occasion of normal maintenance or repair.

All units shipped after October 1, 1983 have the labels installed.

**DANGER**  
**HIGH VOLTAGE**

54-83379A01

**WARNING**  
EXPOSED 117 VAC LINE  
VOLTAGE UNDER COVER  
54B84119B01

54B84119B01

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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# bulletin

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## PORTABLE PRODUCTS

SRN - 1016

APC 287

December, 1983

DEADLINE DATE: December 31, 1984

## SLOW DIGITAL PRIVATE LINE (DPL) DETECTION BY

## PORTABLE USED IN PAC SYSTEM

In some instances portable DPL decode delay may occur when the PAC is transmitting to the portable. This will be evident by missing part of the receive message from the base.

This may be due to DPL code errors being introduced by the mobile and/or PAC system. Due to the many varied system configurations the following information will be necessary when you contact Florida Product Services.

1. Type, model and serial number of PAC and Mobile.
2. Kit number of PAC interface cable
3. Frequencies and DPL code of Mobile and PAC.

Forward the above information to:

Motorola, Inc.  
8000 W. Sunrise Blvd.  
Ft. Lauderdale, FL 33322

ATTN: Product Services

System modification instructions will then be provided to resolve the slow detection condition.

Labor will be allowed to authorized service shops on an individual, agreed upon basis.

NOTE: This affects only PAC'S which incorporate DIGITAL PRIVATE LINE.



# bulletin

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## PORTABLE PRODUCTS

SRN - 1018

APC - 720

February, 1984

DEADLINE DATE: July 31, 1984

## MX300S D.V.P. AND D.E.S. MODULE INCOMPATIBILITIES

Earlier vintage modules used in the VHF & UHF MX300S Digital Protection portables have certain incompatibilities with current parts that could be available for replacement. The first column of parts are no longer available. The second column of parts are an improved version while the last column of parts are the standard parts which should be used for all parts replacement.

Therefore, the following charts and notes should be used to insure compatibility of Flex-O-Pak modules and Modu-Flex circuits. These charts are valid for basic DVP and DES portables. Portables with standard or SP options are covered in the manual.

## FLEX-O-PAK MODULES

<u>EARLIER SP VERSION</u>	<u>LATER SP VERSION</u>	<u>STANDARD VERSION</u>
PLD6710A DVP	PLD6820A	NLD7890A
PLE7050A DVP	PLE7090A	NLE9020A
PLD6690A DES	PLD6850A	NLD7900A
PLE7030A DES	PLE7110A	NLE9010A

## MODU-FLEX CIRCUITS

<u>TYPE</u>	<u>EARLIER SP VERSION</u>	<u>LATER SP VERSION</u>	<u>STD VERSION</u>
VHF/HP PC DVP	PLD6810A	PLD7140A DVP	NLD8010A
VHF/L&M/P PC DVP		PLD6910A DVP	NLD8010A
VHF/HP DVP/DES	PLD6680A	PLD6830A DVP PLD6890A DES	NLD8010A NLD8010A
VHF/L&M/P DVP/DES	PLD6720A	PLD6840A DVP PLD6960A DES	NLD8010A NLD8010A
VHF/L&M/P PC DES		PLD6880A DES	NLD8010A

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.



MODU-FLEX CIRCUITS  
(CONTINUED)

<u>TYPE</u>	<u>EARLIER SP VERSION</u>	<u>LATER SP VERSION</u>	<u>STD VERSION</u>
VHF/HP PC DES		PLD6920A DES	NLD8010A
UHF/H/P DVP/DES	PLE7040A	PLE7080A DVP PLE7100A DES	NLE9340A NLE9340A
UHF/L&M/P PC DVP		PLE7190A	NLE9340A
UHF/HP PC DVP		PLE7200A	NLE9340A
UHF/L&M/P DVP/DES	PLE7060A	PLE7210A DVP PLE7400A DES PLE7440A DES	NLE9340A NLE9340A NLE9340A
UHF/HP PC DES		PLE7380A DES	NLE9340A

The terminology "P.C." means radio equipped with proper code detect which unsquelches radio only when coded carrier received with same code as receiver, "H/P" means high power and "L&M/P" means low and medium power.

NOTE 1:

Use of later SP and STD version DES Flex-O-Pak module requires modifying existing control flex (same as NLN7561ASP09) by removing R310 and running white/green wire (P/N 1000132895, 6.0", 0.13 x 0.13" stripping) from CVC Pin 6 to CVC Pin 6 on the Modu-Flex.

NOTE 2:

Use of DVP Flex-O-Pak module using earlier SP or later SP version Modu-Flex circuit will require cutting a Flex-O-Pak pin so no connection is made to the Modu-Flex. This pin is a switch pin (SW) which is the 5th pin in from the I2 pin. If the STD version of the Modu-Flex is used no pin cutting is necessary.

NOTE 3:

When using the earlier SP version Modu-Flex circuit, with the later SP version and standard version Flex-O-Paks, remove the two plastic guide pins from the Flex-O-Pak base.

Parts and one hour labor to effect this modification are covered by warranty. To obtain this modification for your equipment, contact your local service representative or Motorola Service Station to arrange modification of your equipment.

# bulletin

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COMMUNICATIONS AND ELECTRONICS, INC.

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## PORTABLE PRODUCTS

April, 1984

SRN - 1019

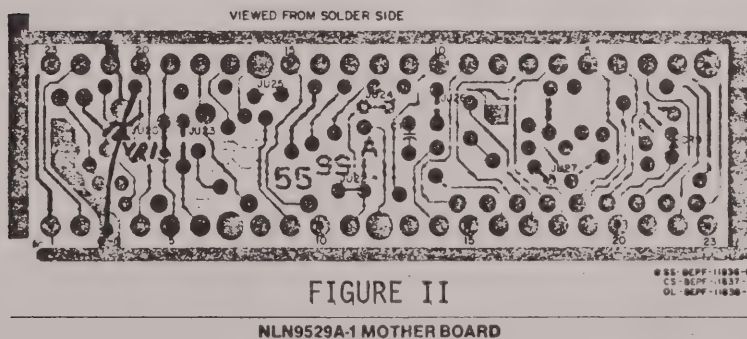
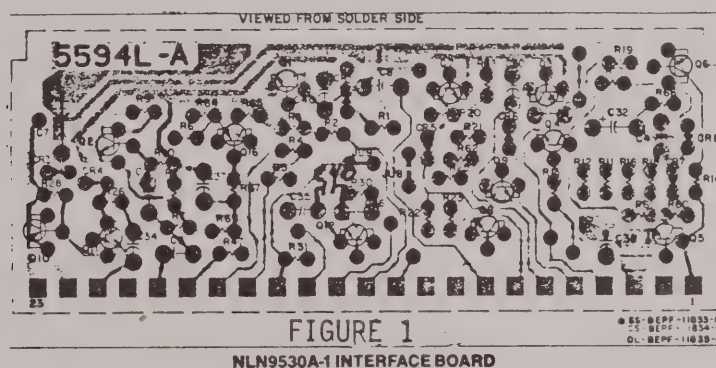
APC - 278, 378, 420, 479, 520, 529

464, 564, 526, 620, 720

DEADLINE DATE: December, 1984

## MX300 SENTRY 1 (MDC) EMERGENCY SIGNALING OPTION BEING ACTIVATED BY STATIC CHARGE

It has come to our attention that in some radios shipped before March 15, 1984 (AJF - S/N), the emergency circuit can be activated by a static charge. This problem can be eliminated by removing capacitors C35 and C36 on the interface board (NLN9530A) and adding capacitor C40. (Part Number 21-82213E08, see Figure 1). Also add 10 volt zener diode (VR1) from I18 to ground on the solder side of the mother board (NLN9529A), see Figure II. The part number for VR1 is 48-82256C11.



If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

Parts and one-half hour labor to effect this modification are covered by warranty. To obtain this modification for your equipment, contact your local service representative or Motorola Service Station to arrange modification of your equipment.

# bulletin

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● 1301 E. ALGONQUIN RD. ● SCHAUMBURG, ILL. 60196 ●

## MOBILE TELEPHONE SYSTEMS AND PRODUCTS

## ROUTING

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SRN-1022

August, 1984

APC-213

Deadline Date: 3/30/85

SUBJECT: TRANSIENT SENSITIVITY IMPROVEMENT FOR *PULSAR II* RCC MOBILE  
RADIOTELEPHONE WITH *SMART* COMPATIBILITY

OPTIONS AFFECTED: T395AB (*SMART* option for Model T1879 VHF *PULSAR II* Mobile  
Radiotelephone)

T395AC (*SMART* option for Model T1839 UHF *PULSAR II* Mobile  
Radiotelephone)

Large transients in automotive electrical systems can cause *PULSAR II SMART* radio-telephones to scan off the calling channel whether the phone is on or off hook. The most serious consequence of this problem would be the inability to receive land-to-mobile calls since the radio is not on its correct calling channel.

In radios where this is a problem, a resistor change on the TRN5278A Supervisory Board can significantly increase transient immunity. Refer to the TRN5278A SUPERVISORY BOARD section 68P81061E06 in the manual provided with the Radio-telephone. Resistor R62 should be changed from 150k to 68k (Motorola Part No. 6-11041D10).

This resistor can be obtained at no charge until March 30, 1985 through your local Motorola Parts Office. Reference must be made to this bulletin, including model and serial numbers for each order.

If this improvement is required for any TRN5278A *PULSAR II SMART* Supervisory Boards shipped from the factory before June, 1984, labor not to exceed 1/2 hour by an authorized Motorola Service Shop can be charged to warranty using the standard warranty procedure. Units shipped after June, 1984, include the resistor change.

## PART REQUIRED

## MOTOROLA

## PART NO.

6-11041D10

## DESCRIPTION

Resistor, fixed 68k ohms,  
±5%; 1/8 W

## \* USER PRICE

\$. 40 pk/10

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.





# bulletin

Motorola Inc.

• Mobile Products Division

• P.O. Box 2931

• Fort Worth, Texas 76113

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## ROUTING:

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**SRN-1024**

August 15, 1984

APC's 243, 429, 463, 481, 492, 493

Deadline Date: December 30, 1984

**Intermittent Potentiometers, SYNTOR X Products**

*SYNTOR X* Engineering has determined that units built between *December 1983 and May 1984* may have intermittent transmitter power or deviation due to the power-set, deviation-set, and compensation-set potentiometers. The potentiometers, which are red and carry Motorola Part No. 18-82374N09, are on the TRN8862A common circuits board in the *SYNTOR X* 800-MHz conventional radio, *SYNTOR X* trunked radio, and *SYNTOR X* consolette.

All *SYNTOR X* units built on or after May 9, 1984 use a different potentiometer (Part No. 18-80087E08). If a unit built before this shows symptoms of this problem, Engineering recommends that you replace its 18-82374N09 potentiometers with 18-80087E08 potentiometers. If the latter are not available, use 18-80268B03 potentiometers.

This SRN authorizes a maximum of ½ hour per unit for the changing of all three parts. These labor charges will be accepted only from authorized Motorola Service Centers. Replacement potentiometers can be acquired under the standard one-year parts warranty.

If you have any questions, please call Product Services, Fort Worth, at 817-232-6242 or Ditel 729-6242.



# bulletin

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## PORTABLE PRODUCTS

SRN - 1026

APC - 422

October, 1984

## MT500 LOW BAND HELICAL ANTENNA TUNING PROCEDURE

The radiation performance of the MT500 low band radio is critically dependent on the tuning of the aluminum tuning slug located in the top of the 12 inch long antenna. This SRN will describe the equipment and procedures required to adjust the antenna tuning slug to maximize the "talk" range of the portable.

Two procedures will be provided. The first procedure is the factory recommended procedure to maximize radiation performance. The alternative procedure can be used if there are equipment limitations.

- (1) Recommended Procedure: Recommended for optimal antenna performance.
- (2) Alternative Procedure: For situations where equipment is limited.

Antenna Models Affected:

<u>Antenna Kit</u>	<u>Frequency Range (MHz)</u>	<u>Antenna Color Code</u>
NAB6001A	30.0 to 35.0	Yellow
NAB6002A	35.0 to 40.0	Green
NAB6003A	40.0 to 45.0	Black
NAB6004A	45.0 to 50.0	Blue

## RECOMMENDED PROCEDURE

Equipment Requirements:

- (1) Aluminum or copper sheet: Length 44 in., Width - 29 in., Minimum thickness 1/16"
- (2) Field Strength Meter: See schematic
- (3) Non-metallic tuning tool with at least a 6 inch shaft. P/N 660835721
- (4) Glyptol (for slug) P/N 1100008675
- (5) Pliobond (for antenna cap) P/N 1100842335
- (6) Screwdriver P/N 66080343A16



### Set-Up:

- (1) Place the field strength meter on the ground plane sheet as shown in the diagram. Figure 1.
- (2) Insure that all objects within an approximate five foot radius have no effect on a meter reading. To obtain this reading place the radio to be tuned on the ground plane and move the object and note if a change is detectable on the meter. Place the test set-up clear of all objects which disturb the tune-up procedure.

### Tune-Up:

(NOTE: The antenna must be tuned on the radio with which it will be used.)

- (1) Remove the antenna tip cover
- (2) With a heavy screwdriver loosen the aluminum slug. The slug position is fixed at the factory with glyptol sealant.
- (3) Preposition the slug at the top of the form.
- (4) Set the low band MT500 to be tested upright on the ground plane with the grey PTT switch on the side of the radio facing away from the field strength meter.
- (5) The exact position of the radio should be as follows: See Figure 1.
  - A. 23 inches from the meter for radios that transmit 40 to 50MHz.
  - B. 25 inches from the meter for radios that transmit 30 to 40MHz.

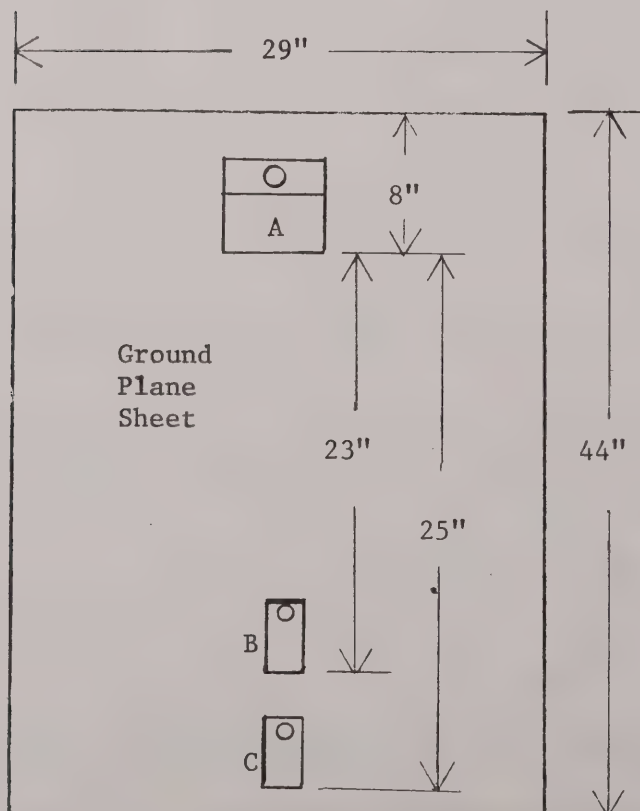


Figure 1:

Recommended setup for  
tuning MT500 low band  
antennas

A: Field strength meter

B: 40 to 50MHz position

C: 30 to 40 MHz position

#### Tune-Up (Cont'd):

- (6) Turn the on/off switch on.
- (7) Select the frequency that is nearest the middle of the transmit frequencies of the radio.
- (8) Hold the radio keyed with one hand.
- (9) Place the long non-metallic screwdriver into the tuning slug slot in the top of the antenna. Your hand must be greater than 6 inches from the top of the antenna.
- (10) Start rotating the slug clockwise down into the antenna. The meter should deflect 1/4 to 3/4 full scale as the meter needle rises and peaks.
- (11) Turn the slug past the peak to confirm a clearly identifiable peak.
- (12) Rotate the slug back to the peak.
- (13) Apply a small amount of glyptol to the slug to hold in place.

#### ALTERNATIVE TUNE-UP PROCEDURE

If the equipment specified in the preferred procedure outlined previously is not available, the following procedure can be used to tune-up MT500 low band antennae.

#### Equipment Requirements:

- (1) Field strength indicator such as a field strength meter, R2001 monitor or spectrum analyzer with sense antenna.
- (2) Non-metallic tuning tool with at least a 6 inch shaft.
- (3) Slug sealant glyptol 1100008675 recommended.
- (4) Cap sealant, pliabond by Good Year. P/N 110042335.

#### Set-Up:

- (1) Position yourself at least five (5) feet from the field strength indicator clear of metallic objects of significant size within a 5 foot radius that could affect antenna tuning.
- (2) Preposition the slug at the top of the form.

#### Tune-Up:

- (1) With the radio keyed on a middle transmit frequency with the associated antenna, and held at face level, adjust the tuning slug with a non-metallic screwdriver. Be sure your hand is at least 5 inches above the top of the antenna.

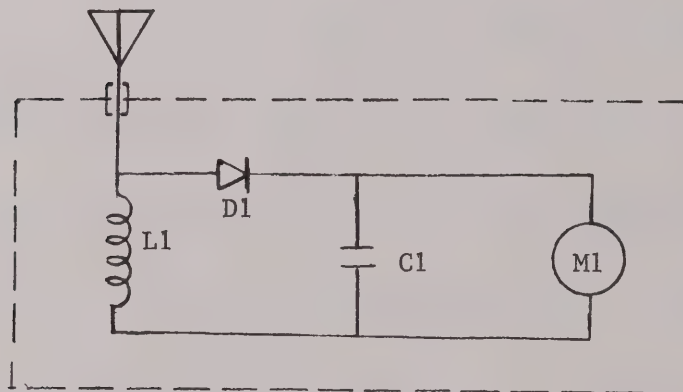
### Tune-Up (Cont'd):

- (2) Tune for a peak reading on the field strength indicator. Tune past the peak and back to the peak to be sure your tuning achieves peak.
- (3) Seal the slug position with glyptol or equivalent.
- (4) Seal the antenna cap with pliabond or equivalent.

### OPERATIONAL NOTES

Low band portable radios positioned at belt level in a carry case or with a belt clip back cover can experience significant antenna radiation efficiency loss. It is not recommended that these radios be used with a remote speaker microphone accessory while the radio is on the belt. Hand held at face level is best for portable operation.

### FIELD STRENGTH METER SCHEMATIC AND PARTS LIST



### PARTS LIST

ANTENNA:	85-05183K02	HT90 UHF Helical (Approx. 2 in. long)
COIL L1:	24-82723H07	10 uH
CAPACITOR C1:	21-82187B11	1500 pF
DIODE D1:	48-82178A04	General Purpose Germanium
METER M1:	50 u Amp Full Scale d' Arsonval Movement	
ENCLOSURE:	Aluminum Bud Box Approximately 4 x 3 x 3 or Meter Box	
CONNECTOR:	UG290/u	

This bulletin is for information only and does not imply any warranty considerations.

# bulletin

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## ROUTING

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SRN-1027

March, 1985

APC-N/A; General

Deadline Date: N/A

SUBJECT: SECURE COMMUNICATIONS EQUIPMENT TRANSMITTER DEVIATION  
MEASUREMENT AND ADJUSTMENT

MODELS AFFECTED: All Secure Communications Radio Products

Measurement of Secure Communications equipment transmitter deviation (Private mode) may be accomplished using the equipment listed in the table below. Special settings, if required, are also shown.

<u>MEASUREMENT EQUIPMENT</u>	<u>REQUIRED SETTINGS</u>	<u>READ DEVIATION</u>
R1200 Service Monitor	Set i-f to Wide position if a Wide Band mixer is used.	Average meter excursions after approximately 15 seconds settling time.
R2001 Communications System Analyzer	1. Set i-f to Wide position 2. Function - Set to Power Monitor or Monitor 3. Display Selector - Modulation	Oscilloscope - <u>ONLY</u> dc coupled
R2200 Communications Service Monitor	1. Set i-f to Wide position 2. Function - Set to Power Monitor or Monitor 3. Display Selector - Modulation	Oscilloscope - <u>ONLY</u> dc coupled

The following is a photograph of a typical transmit eye pattern as it is received and displayed using the scope output of an R2200 Communications Service Monitor. Details on precise eye shape or opening are not specified because variations caused by monitor equipment are generally much more significant than variations of the actual transmitter waveforms in Secure Communications equipment. The ability to precisely view these characteristics is not required to properly set transmitter deviation for optimum system performance.

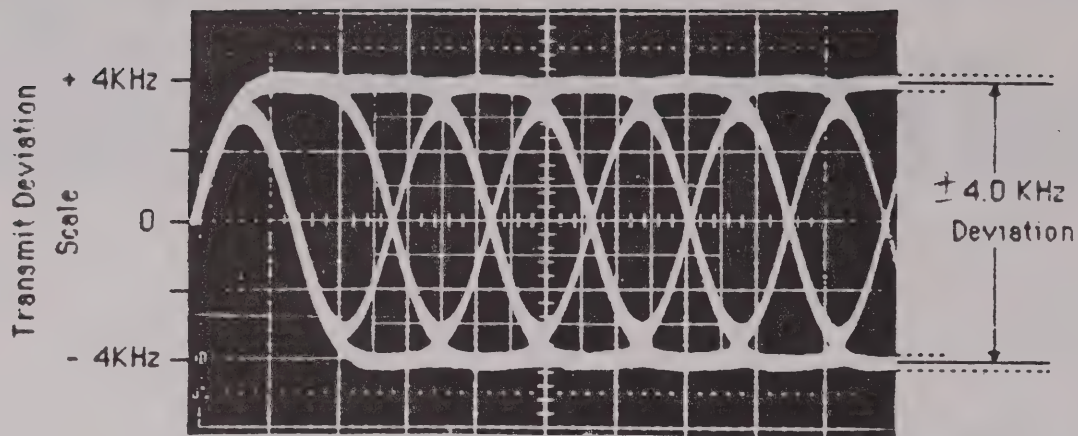
(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

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\*Net User Price — For domestic use only and subject to change without notice.





Typical Transmit Eye Pattern Displayed on an R2200  
Communications Service Monitor

1. The i-f of the monitor and the video bandwidth of the measuring oscilloscope should be set to its widest value.
2. The deviation adjustment procedure as described in the equipment service manual should be followed. The service manual also contains definitions of terminology used in digital communication systems.
3. As in the measurement of clear mode deviation (using an oscilloscope or CRT display), the distance from the top center of the waveform to the bottom center of the waveform is defined as the peak-to-peak deviation. When using either a meter or an oscilloscope fluctuations must be averaged out (as is done with any other noise measurement such as 20 dB Quieting). Refer to the previous waveform.
4. The use of external oscilloscope measurements is acceptable if dc coupling is used. The scope may be calibrated by using clear mode modulation. Adjust the scope gain for a reasonable amplitude reading such as  $\pm 2$  divisions =  $\pm 4$  kHz deviation.
5. Measurement:

Optimum system performance is achieved with the transmitter deviation set to  $\pm 4.0$  kHz deviation. Each channel should have its actual deviation no less than  $\pm 3.5$  kHz deviation nor greater than  $\pm 4.5$  kHz deviation. This will ensure acceptable system performance. The actual deviation, as adjusted at the factory, is adjusted to ensure the deviation is within this range for all frequencies. Field measurements of factory adjusted equipment can exhibit additional variation due to differences in test equipment calibration. Expected variations in test equipment are nominally  $\pm 5\%$  (or  $\pm 200$  Hz). Therefore, field measurements of factory set deviation may vary an additional  $\pm 200$  Hz due to the calibration accuracy of the test equipment.

## 6. Adjustment:

Transmit deviation should be adjusted to 4.0 kHz for optimum system performance. To adjust transmit deviation choose a channel near the center of the frequency range (or as specified in the equipment deviation and adjustment procedure) and set for 4.0 kHz transmit deviation. All radio frequencies should be checked if an adjustment is being made. Deviation may vary from channel to channel but must remain in the range of approximately 3.7 kHz to 4.3 kHz. This will ensure that the actual deviation is between 3.5 kHz and 4.5 kHz when accounting for test equipment calibration and setting accuracies.

This is a service aid bulletin for information purposes only. No warranty costs are implied or intended.



# bulletin

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PORTABLE PRODUCTS

SRN - 1032

February, 1985

## CLEANING PROCEDURES

### FOR PORTABLE RADIO EQUIPMENT WITH PLASTIC POLYCARBONATE HOUSINGS

Cleaning of Motorola portable radio equipment may be categorized as follows:

1. External surfaces
2. Internal components

External surfaces include front and back covers, frames, housings and battery covers. The only recommended agent for cleaning the external radio surfaces is a 0.5% solution of a mild dishwashing detergent in water.

The only factory recommended liquid for cleaning printed circuit boards and their components is ISOPROPYL alcohol (70% by volume).

**CAUTION**

The effect of certain chemicals and their vapors are known to have devastating results on certain plastics. Aerosol sprays and tuner cleaners may cause damage also. Even though the basic cleaning chemical may be compatible, the propellant or carrier may not be compatible and cause damage. Therefore, it is recommended that all chemicals and cleaning agents other than a mild dishwashing detergent be avoided.

#### 1. Cleaning External Surfaces

##### a. Polycarbonate Surfaces

The detergent-water solution should be applied sparingly with a stiff, non-metallic, short-bristled brush to work all loose dirt away from the radio. A soft, absorbent, lintless cloth or tissue should then be used to remove the solution and dry the radio. Make sure that no water remains entrapped near the connectors, cracks or crevices. Do not immerse the radio in the cleaning solution.

Page 1 of 2

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.



1. Cleaning External Surfaces (Cont'd)

b. Silverized Surfaces

A non-metallic soft bristle brush should be used to apply the detergent-water solution to silverized surfaces, and a second non-metallic, soft bristle brush (free of detergent, or rinsed in clean water) should be used to remove the detergent-water solution.

Upon completion of the cleaning process, a soft, absorbent lintless cloth or tissue should be used (with a blotting action) to dry all surfaces. The blotting action will prevent damage to the silverized conductive coating.

2. Cleaning Internal Circuit Boards and Components

Isopropyl alcohol may be applied with a stiff, non-metallic, short-bristled brush to dislodge imbedded or caked materials located in hard-to-reach areas. Brushing strokes should direct the dislodged material out and away from the inside of the radio.

Alcohol is a high-wetting liquid and can carry contamination into unwanted places if an excessive quantity is used. Make sure that controls or tuneable components are not soaked with the liquid. Do not use high pressure air to hasten the drying process, since this could cause the liquid to puddle and collect in unwanted locations.

Upon completion of the cleaning process, use a soft, absorbent, lintless cloth to dry the area. Do not brush or apply any isopropyl alcohol to the frame, front cover or back cover.

**NOTE**

Always use a fresh supply of alcohol, and a clean container, to prevent contamination by dissolved material (from previous usage).

# bulletin

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## PORTABLE PRODUCTS

SRN - 1034

APC-626

October, 1985

DEADLINE DATE: July 31, 1986

## STX TRANSMIT AUDIO SENSITIVITY PROBLEM

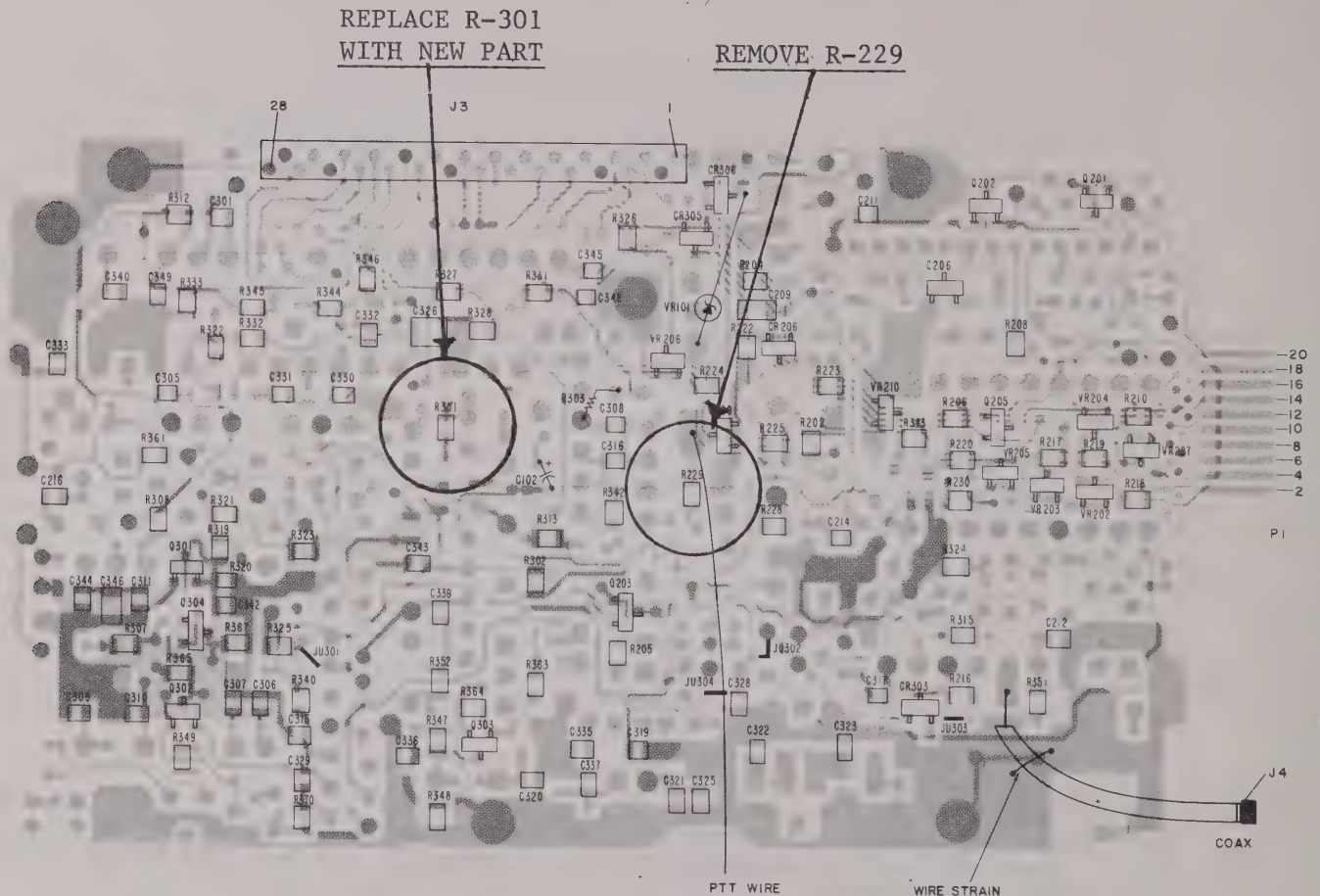
It has come to our attention that in some radios shipped before October 1, 1985 (AKU) could exhibit the problem of transmitter sensitivity being too low. Radios will not deviate sufficiently with normal voice and receiving unit will exhibit soft audio.

Models Affected:	H25TJB5170A	H35STC5170A
	H35TJB5170A	H25STD5170A
	H25TJC5170A	H35STD5170A
	H35TJC5170A	H25STE5170A
	H25STC5170A	H35STE5170A

Verification of Symptom: Input a 500 Hz tone at 107 db sound pressure level into the radio front cover microphone, (2" away from the top left corner of the grill area). Transmit in the unsquelched (US) test mode. Monitor the deviation for 2 KHz deviation minimum.

An alternate method is to loudly speak "four" into the microphone and monitor deviation for 2 KHz.

Recommended Rework: If deviation is less than 2 KHz, then remove chip resistor R229 from the back of the transceiver board. Also replace R301, 150 K ohm with 270 K ohm, P/N 0660076B11.



**Transceiver PCB, Layers 5 and 6, With Leadless Component Overlay.  
Viewed From Side 2 (Leadless Component Side)**

Parts and 1/2 hour labor to effect this modification are covered by warranty. To obtain this modification for your equipment, contact your local service representative or Motorola Service Station to arrange modification of your equipment.



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## PORTABLE PRODUCTS

SRN-1035

APC 402/446

January, 1986

DEADLINE DATE: June 30, 1986

## EXPO AND HT90/440 MULTI-UNIT RAPID CHARGE CHARGERS

During a recent evaluation and the NLN7177 and NLN7966 Battery Chargers, a possible failure mode of the SCR was detected. If this mode occurs, the charger will remain in a rapid charge mode. If the charger remains continuously in a rapid charge mode, the thermal fuse activates inside the battery causing battery failure.

In order to prevent this battery failure, a modification is being recommended for all "A" version multi-unit rapid chargers. It includes:

- (1) Installation of six insulators and heatsinks.
- (2) Installation of charger housing bracket.
- (3) Removal of two resistors (R2 and R4) from each charging circuit. - HT charger NLN7966 only.

The insulators and heatsinks are to be attached to the SCR's and the bracket is to replace the existing housing bracket.

Parts and one-half hour labor to effect this modification are covered by warranty. This warranty work must be performed only by an authorized Motorola Service Center. Contact your local service representative or Motorola Service Station to arrange modification of your equipment.

Part Required: RPX4633A

## PROCEDURE:

1. Remove cover from multi-unit charger by removing the six (6) perimeter screws in the baseplate.
2. Remove adhesive backing from insulator (P/N 1405209L08) and apply to underside of each of the six (6) SCR's (P/N 4883875D05) making sure to fully cover the silverized area of each SCR (see Figure 1).
3. Slide heatsink (P/N 2605335Q01) onto the SCR as shown in Figure 1, making sure not to bend or break the leads on the SCR or peel off the insulator.

Page 1 of 3

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.



4. Remove housing mounting bracket (P/N 0705880L01) and replace with new bracket (P/N 0705466Q01) oriented as shown in Figure 2.
5. Remove the two resistors R2 and R4 from the circuit board in HT Charger NLN7966 only.
6. Replace cover and test to be sure all six (6) pockets are in good working order.

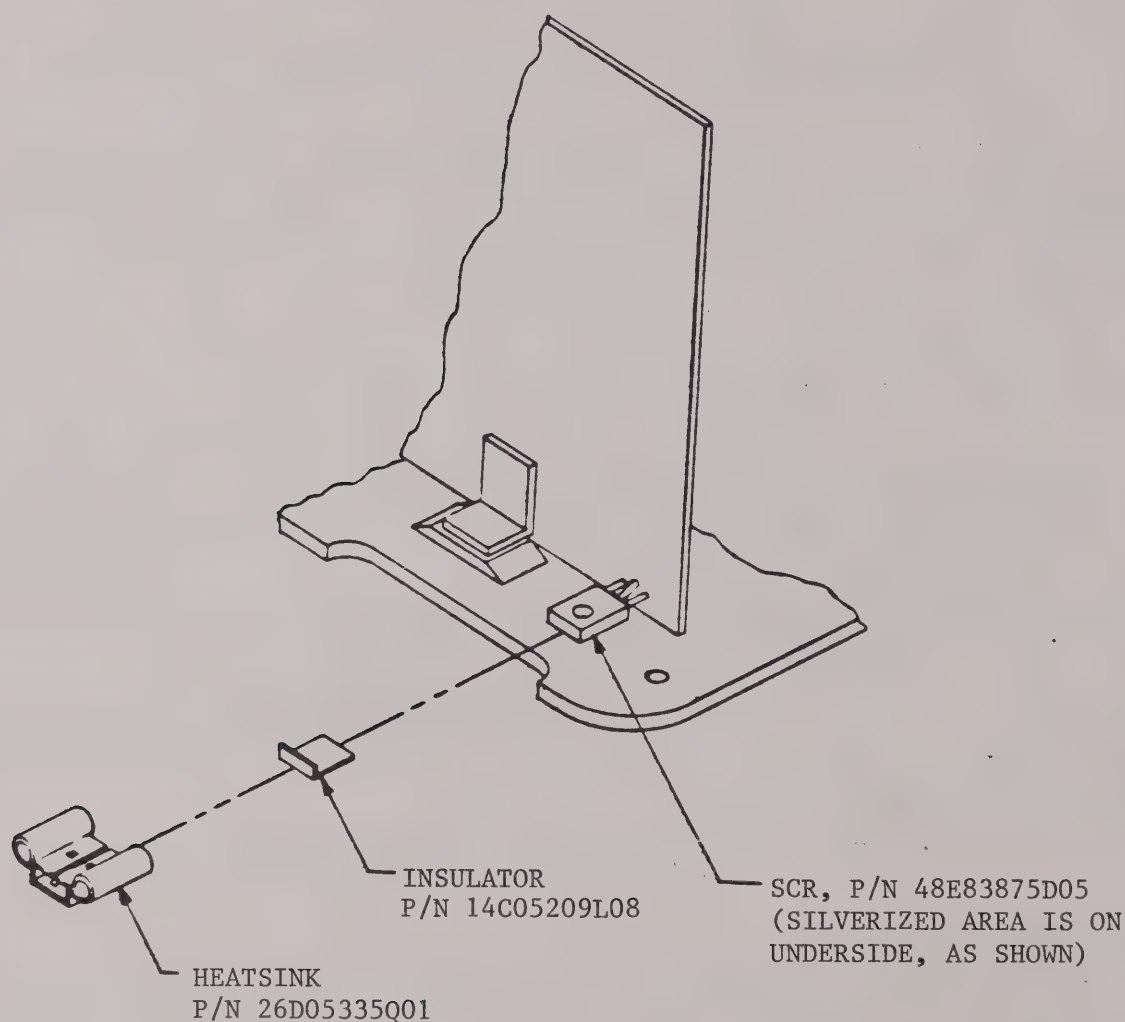


FIGURE 1

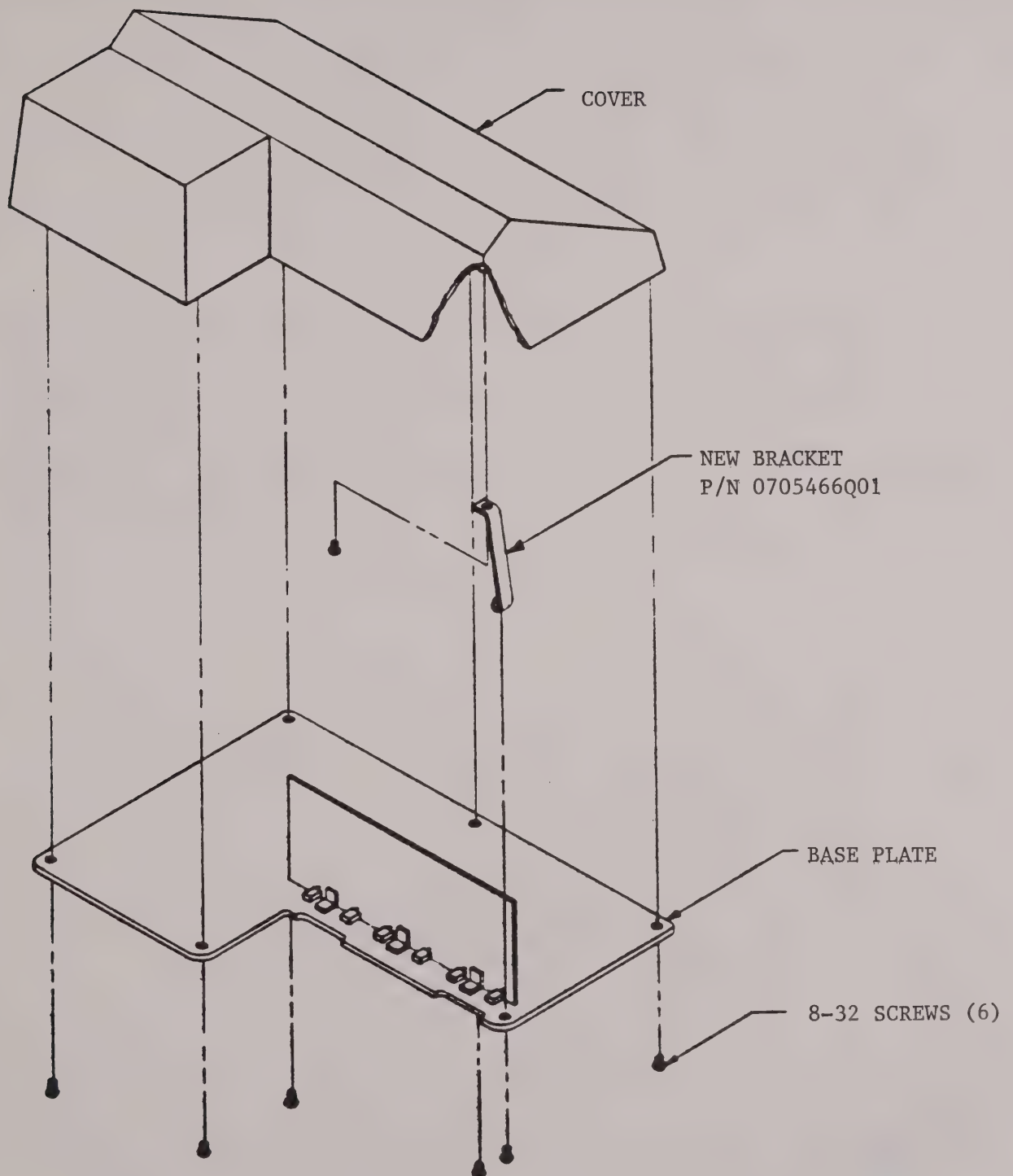


FIGURE 2



# bulletin

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## PORTABLE PRODUCTS

SRN-1036

December, 1985

APC 446, 605, 278, 420, 426, 526

479, 485, 620, 629, 720, 729

DEADLINE DATE: June 30, 1986

## MX AND EXPO RADIO BATTERY CONTACTS

An improved battery contact and contact support have been designed for MX and Expo radios. (MXR has different contacts and is not included). The dimensions of the contact and contact pad have been changed so that the contact is about .010 to .020 inches higher than before. The material of the pad has been changed to provide a greater resilience. These changes produce a more reliable contact between battery and radio. This eliminates intermittent radio operation and/or loss of DES coding caused by poor contact between battery and radio. The new contact and support can be identified as noted in Figure 1. The new contact has a 6 stamped on it and the pad is green in color. It is recommended that the old contacts and supports be replaced during routine maintenance procedures.

## NOTE:

- A. New contacts are stamped with a 6 on this area.
- B. New contact support pads are green.

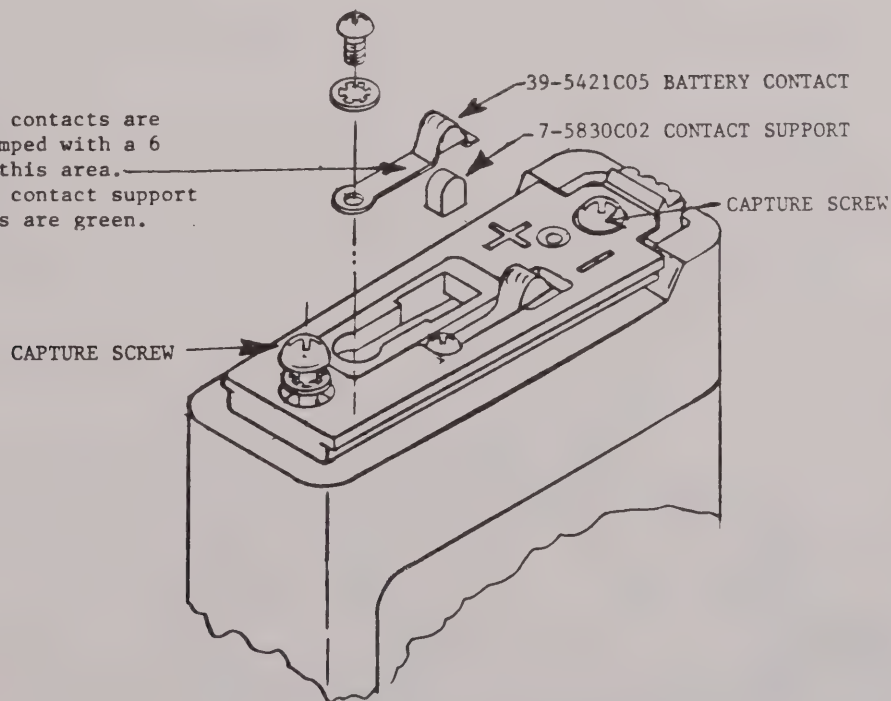


FIGURE 1

Page 1 of 3

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.



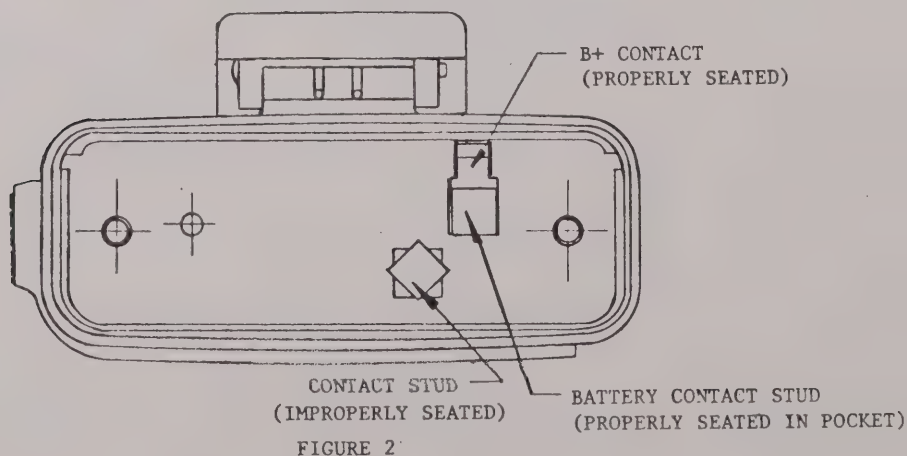
The new contacts and supports will be supplied for your radios at no charge upon request to C. & E. Parts. When ordering parts this bulletin must be referenced. There is no warranty labor allowance for this improvement.

#### PROCEDURE:

##### Expo Radio

If the radio has been disassembled, re-assemble the transceiver into the housing, making sure that the captive screws are torqued properly and the control top O-ring is seated properly.

- Step 1: Turn off the radio and remove the battery.
- Step 2: Tighten baseplate capture screws to proper torque (Figure 1).
- Step 3: Carefully remove the two battery contact screws, lockwashers, contacts, and rubber supports as shown in Figure 1. When removing the screws, use minimum axial force necessary to unthread the screws.
- Step 4: Place a new rubber support in the half cylindrical surface of a new battery contact.
- Step 5: Place the assembled contact and support in position on the bottom of the radio, making certain that the flat surface of the rubber support is flush with the baseplate surface. The tab at the end of the contact must be fit into the appropriate recess before the remaining length of the contact is lowered into position.
- Step 6: Install the two contact screws with two lockwashers, using minimum axial force to start the threads. Tighten each screw to three inch-pounds.
- Step 7: Remove the transceiver kit from the housing and check to make sure the battery contacts are squarely seated in their pockets. (See Figure 2).
- Step 8: If contact is not properly seated in pocket as shown in Figure 2, loosen battery contact screw and rotate stud into properly seated position and retighten screw to appropriate torque.



### MX Radio

1. Remove battery.
2. Remove contact mounting screws and washers.
3. Remove and discard the old contacts and supports.
4. Install new contact and pads.
5. Replace battery.

When ordering contacts and supports use RPX4636A. This kit contains two each 39-5421C04 contact and 7-5830C02 support. Order one RPX 4636A per radio.

(11/14/86)



# bulletin

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COMMUNICATIONS AND ELECTRONICS, INC.

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## PORTABLE PRODUCTS

SRN - 1036

ADDENDUM A

December, 1985

APC 446, 605, 278, 420

479, 485, 526, 620

DEADLINE DATE: June 30, 1986

## MX AND EXPO RADIO BATTERY CONTACTS

When ordering contacts and supports use RPX4636A. This kit contains two each 39-5421C05 contact and 7-5830C02 support. Order one RPX4636A per radio.





# bulletin

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## PORTABLE PRODUCTS

SRN-1037

January, 1986

APC 446-605

DEADLINE DATE: July 1, 1986

## UNIVERSAL EXPO SPEAKER BRACKET C-401 REPLACEMENT

The universal expo speaker bracket NTN4310A contains a 51-5337F89 speaker microphone switching board with a C-401 PN 23-5161K28 chip capacitor. As a product improvement, this capacitor is being replaced with a more rugged leaded capacitor PN 2382397D18. This replacement is recommended during routine service of the portable.

The leaded replacement capacitor PN 2382397D18 is available at no charge from National Parts through July 1, 1986. No labor is offered for replacement.

PROCEDURE:

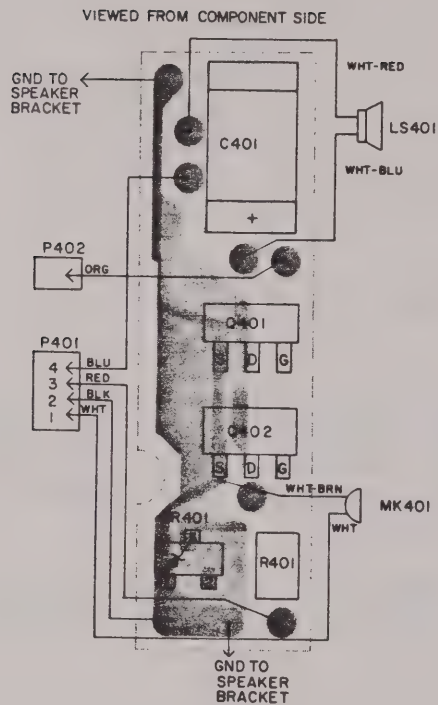
- (1) Unclip the harness.
- (2) Desolder the blue and white/red wires.
- (3) Remove the leadless C-401 capacitor PN 23-5151K28 from the 51-5337F89 circuit board.
- (4) Tack solder the blue and white/red wires as shown in the diagram.
- (5) Bend the leads of the PN 23-82397D18 capacitor to fit the holes vacated by the blue and white red wires. Clip the leads approximately 1/16" long.
- (6) Solder the PN 2382397D18 capacitor positive lead in the hole vacated by the blue wire, negative lead solders in the hole vacated by the white/red wire.
- (7) Carefully "dress" wires around body of capacitor and reclip the harness.

Page 1 of 2

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

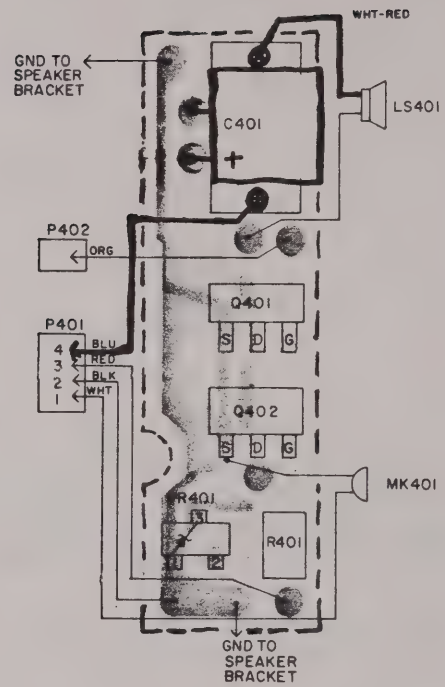
# BEFORE



● 55-BEPF-15634-C

OL-BEPF-16477-0

# AFTER





# bulletin

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## PORTABLE PRODUCTS

SRN - 1038

APC-626

August 1986

DEADLINE DATE: December 1986

## STX PORTABLES THAT DROP OUT OF PHONE INTERCONNECT

## BACK TO DISPATCH MODE OF OPERATION

It has come to our attention that all STX radios shipped before May 29, 1986 (ALK) with connect tone 3 (90.0 Hz) can exhibit the problem of resetting during transmit. This problem is most noticeable in phone interconnect operation, since after a reset the radio will operate in dispatch. It would appear as if the radio returned to dispatch from phone for no reason.

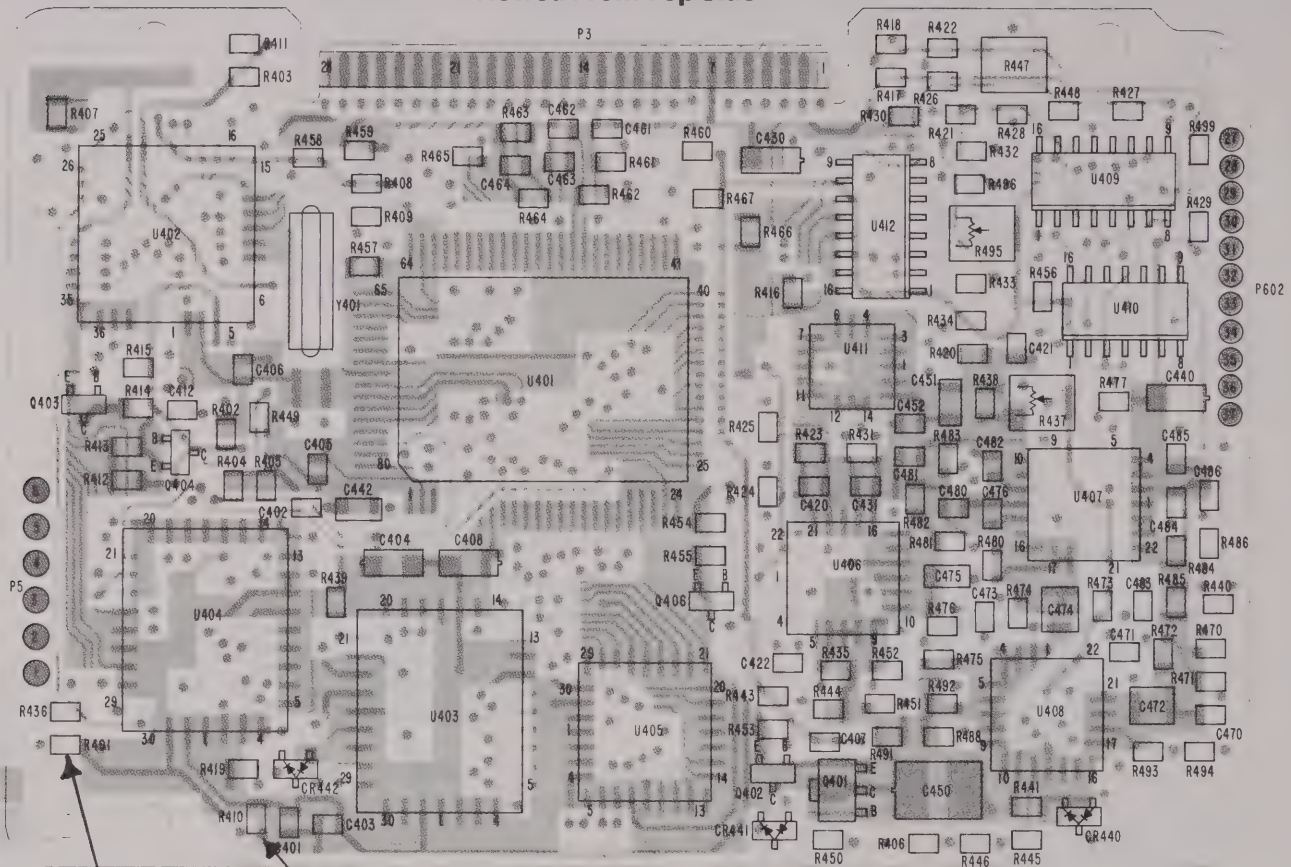
VERIFICATION OF SYMPTOM: Verify that the radio has a serial number prior to ALK. Also check with your Area Engineering office to see if the radio is programmed to have connect tone 3.

RECOMMENDED REWORK: Two different reworks are necessary depending on which controller board kit is in the radio. All necessary parts will be in RPX-4666A. Refer to Figure 1 and the notes listed below.



Figure 1

Viewed From Top Side



Insert (zero ohm resistor) 0606021K01 for (R401) here

Remove (R410) 0660076B01 here

Note:

If your controller board is an NTN4497A, the U404 will have 1.4 on the label. U404 must be replaced with Part Number 01-05954N19 (3.4 on the label). R401 must be replaced with Part Number 06-05021K01 (0 ohms) and R410 must be removed. No reprogramming is necessary with this modification.

Note 2:

If your controller board is an NTN4497"B" or "C" the U404 will have 2.0 or 3.0 on the label. The only part that need be replaced is the U404. Replace U404 with Part Number 01-05954N19 (3.4 on the label) and no reprogramming is necessary with this modification.

Parts and one-half hour labor to effect this modification are covered by warranty. To obtain this modification for your equipment, contact your local service representative or Motorola Service Station to arrange modification of your equipment.



# bulletin

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SRN - 1039

July 1986

APC - 230

## N-1248A MT500 CONVERTA-COM MECHANICAL IMPROVEMENTS

This bulletin supercedes previous SRN - 833, 834, 841, 913, 913A and 1009 on the N-1248A Converta-Com.

During early 1986, a number of minor and major components of the MT500 Converta-Com were redesigned to improve reliability as well as serviceability. The changes included:

- (1) Redesign of the actuator assembly to eliminate the safety wire locking mechanism.
- (2) Respecification of the contact pin springs to improve resilience and serviceable life.
- (3) Redesign of the Converta-Com chassis to include a lock assembly stabilizing bracket.
- (4) Respecification of the actuator arm and pawl arm to improve wear characteristics and ease portable insertion forces.
- (5) Redesign of the adjustment bushing to provide greater flexibility in the adjustment procedure.
- (6) Respecification of applicable lubricants to assure a longer useful life and ease actuation forces.
- (7) Respecification of several fasteners to improve reliability.
- (8) Redesign of the locating pin tip to provide for a more reliable retention of the portable in the Converta-Com.

All of the above changes can be easily retrofitted to existing units. A description of each of the changes follows: [All reference numbers in parenthesis (), refer to the Mechanical Parts List and Detail, Page 24, of the MT500 Series Converta-Com Mobile Radio Console Instruction Manual, 68P81013C40-C.]

1. Redesign of the actuator assembly to eliminate the safety wire locking mechanism.

The actuator assembly has been redesigned to eliminate three hold-down screws (117), (118) and (124), a spring washer (155), safety wire (69) and Loctite. The base casting (122) is now supplied with molded-in studs which simulate the three screws. A cotter pin and three circlips replicate the function of the spring washer and safety wire. Repair parts for the old style actuator assembly will be furnished as long as supplies are available. Thereafter, parts will only be available for the new style actuator assembly which can be easily retrofitted to all existing units. An alternative is to replace the complete 01-5953D14 assembly.

<u>Description</u>	<u>Part Number</u>	<u>Quantity Used</u>	
		<u>Old Design</u>	<u>New Design</u>
Actuator Arm	4505161F01*	1	1
Actuator Base	4505162F01*	1	1
Pawl Arm	4505588H01*	1	1
Pawl Arm Hold-Down Screw	0305126F13	1	0
Lock-Out Hold-Down Screw	0305126F11	1	0
Actuator Arm Hold-Down Screw	0304126F09	1	0
Safety Wire	3010151A38	As required	Not required
Loctite	1110019B14	As required	Not required
Adjustment Bushing	4305587H01*	1	1
Actuator Arm/Pawl Arm Circlip	4210219A20	0	2
Lock-out Circlip	4210219A34	0	1
Adjustment Bushing Cotter Pin	2200125842	0	1

\*Indicates parts common to both the old and new design actuator assemblies which have been upgraded in specification coincident with the introduction of the new design actuator assembly. All parts are usable with both the old and new design actuator assemblies.

2. Respecification of the contact pin springs to improve resilience and serviceable life.

The contact pin springs (140) have been respecified to improve their resilience and serviceable life. The new springs, made of a stainless steel alloy, can be easily identified by their silver color; the previous springs, made from a copper alloy, were gold in color. In addition, the new springs are approximately 1/16" in diameter; the old springs were approximately 3/32" in diameter. Although these new springs may appear to exert less force on the contact pins than the previous copper-alloy springs, they will, in fact, exert this level of contact force through a much greater serviceable life. The initial lower level of spring force on the new springs does not indicate a degradation of spring quality. This new contact pin spring is directly retrofittable to all existing Converta-Coms.

Caution: Both new and old versions of the contact pins spring can be overcompressed if caution is not exercised when installing the new parts. Whenever installing new contact pin spring, or adjusting contact spring deflections, take care to depress the springs only the minimum amount necessary to accomplish the repair procedure.



3. Redesign of the Converta-Com chassis to include a lock assembly stabilizing bracket.

The new Converta-Com chassis (6) has been redesigned to include a stabilizing bracket for the lock assembly. Incorporation of this bracket will prevent the lock from being pryed away from the pawl arm when the portable radio is ejected. Because this change is not easily retrofitted by replacing the entire chassis, a retrofit kit, RPX4634A, has been developed with a rivet-able bracket which exactly duplicates the lock stabilizing function.

4. Respecification of the actuator arm and pawl arm to improve wear characteristics and ease portable insertion forces.

The actuator arm (132) has been respecified to improve wear along the pawl arm (119) latching surface. A new, more durable plating will reduce friction between the metallic sliding parts and thereby reduce the force required to eject a portable radio unit. The new actuator arm can be easily identified by its "H" revision level letter cast into the central web area of the part. This actuator arm is directly retrofittable to all existing Converta-Coms.

5. Redesign of the adjustment bushing to provide greater flexibility in the adjustment procedure.

The adjustment bushing (100) has been redesigned to accommodate 18 adjustment slots, six more slots than the previous adjustment bushing. The increased number of adjusting slots will provide for finer adjustment of the actuator arm contacts. The new adjustment bushing can be easily identified by its 18 slots. This adjustment bushing is directly retrofittable to all existing Converta-Coms.

6. Respecification of applicable lubricants to assure a longer useful life and ease actuation forces.

Until recently, GE661 Silicon Fluid (1110027B08) has been recommended for use with the Converta-Com. A new lubricant, Lubriplate Aero (1100490820), should henceforth be used as the general purpose, mechanical lubricant for the Converta-Com. GE661 Silicon Fluid should no longer be used. Proper and timely lubrication is an important feature of any equipment preventative maintenance program and attention to lubrication of the Converta-Com is no exception. Refer to the recommended lubrication points section of the Instruction Manual.

7. Respecification of several fasteners to improve reliability.

A number of changes to fastener specifications have been made to improve reliability of the Converta-Com.

The following parts have been added and may be retrofitted at the discretion of the repair technician.

- (1) A lockwasher (0400001706) has been added to the screw (14) which retains the lock button (13) to the lock cylinder (12).
- (2) Lockwashers (0400007652) have been added to the securing bolts (7) which retain the actuator base (122) to the Converta-Com chassis (6).

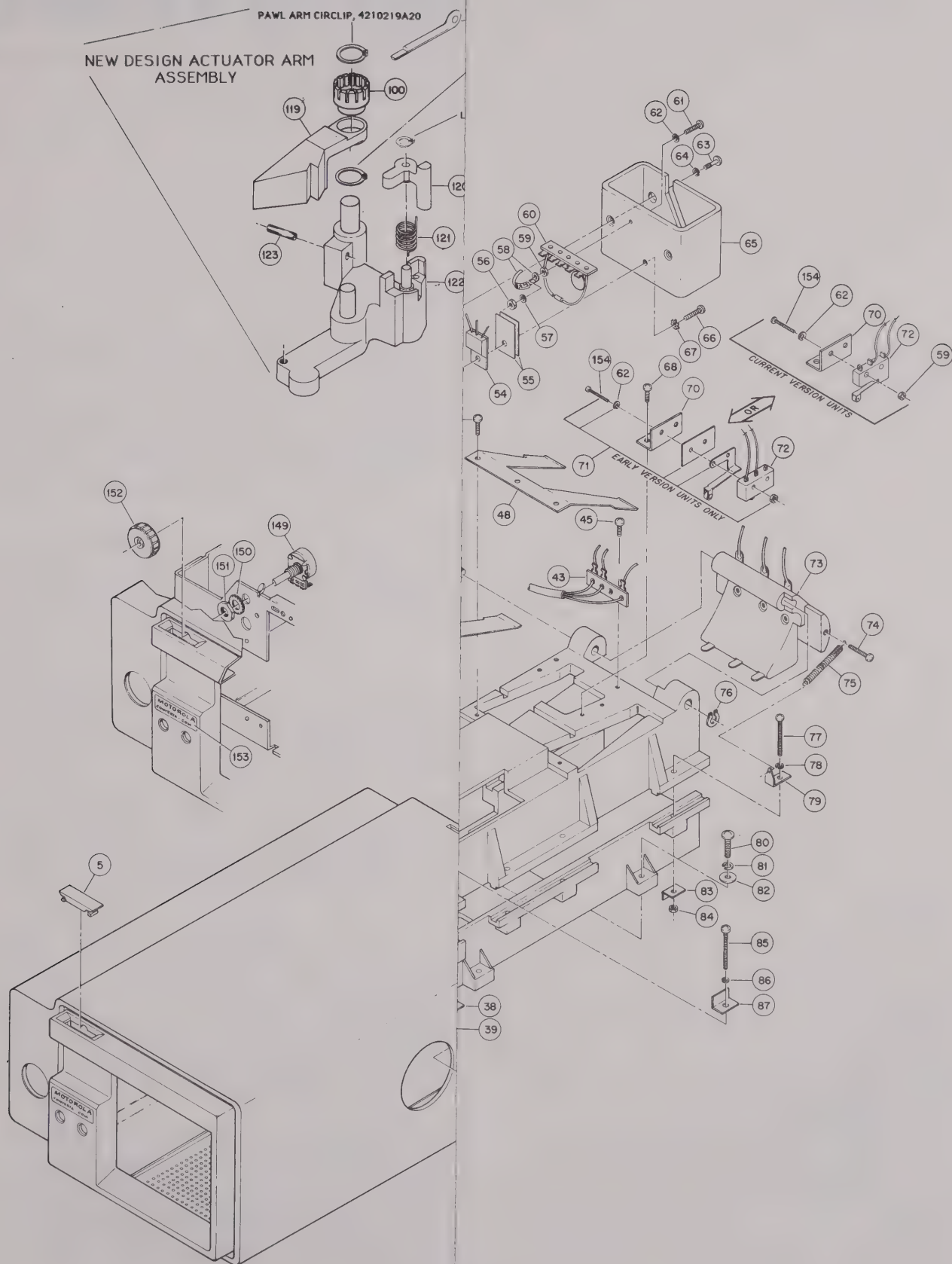


(3) Loctite thread locking compound (1110019B14) has been added to the four screws (80) retaining the pocket (36) assembly to the Converta-Com chassis (6), the two screws (136) retaining the contact block (139) assembly to the actuator arm (132), and the two screws (154) which retain the S1 switch (72) to its right-angle bracket (70). A word of caution; when applying Loctite, or any other thread-locking compound containing cyanoacrylates, care must be taken to assure none of the compound comes in contact with any plastic parts. These compounds can degrade their accompanying plastic parts, if indiscriminately used.

8. Redesign of the locating pin tip to provide for a more reliable, long-term retention of the portable in the Converta-Com.

The locating pin (134) has been redesigned to provide for deeper penetration into the side of the retained MT portable. This new locating pin is directly retrofitable to all existing Converta-Coms.

This SRN is for information only and does not offer any warranty consideration.



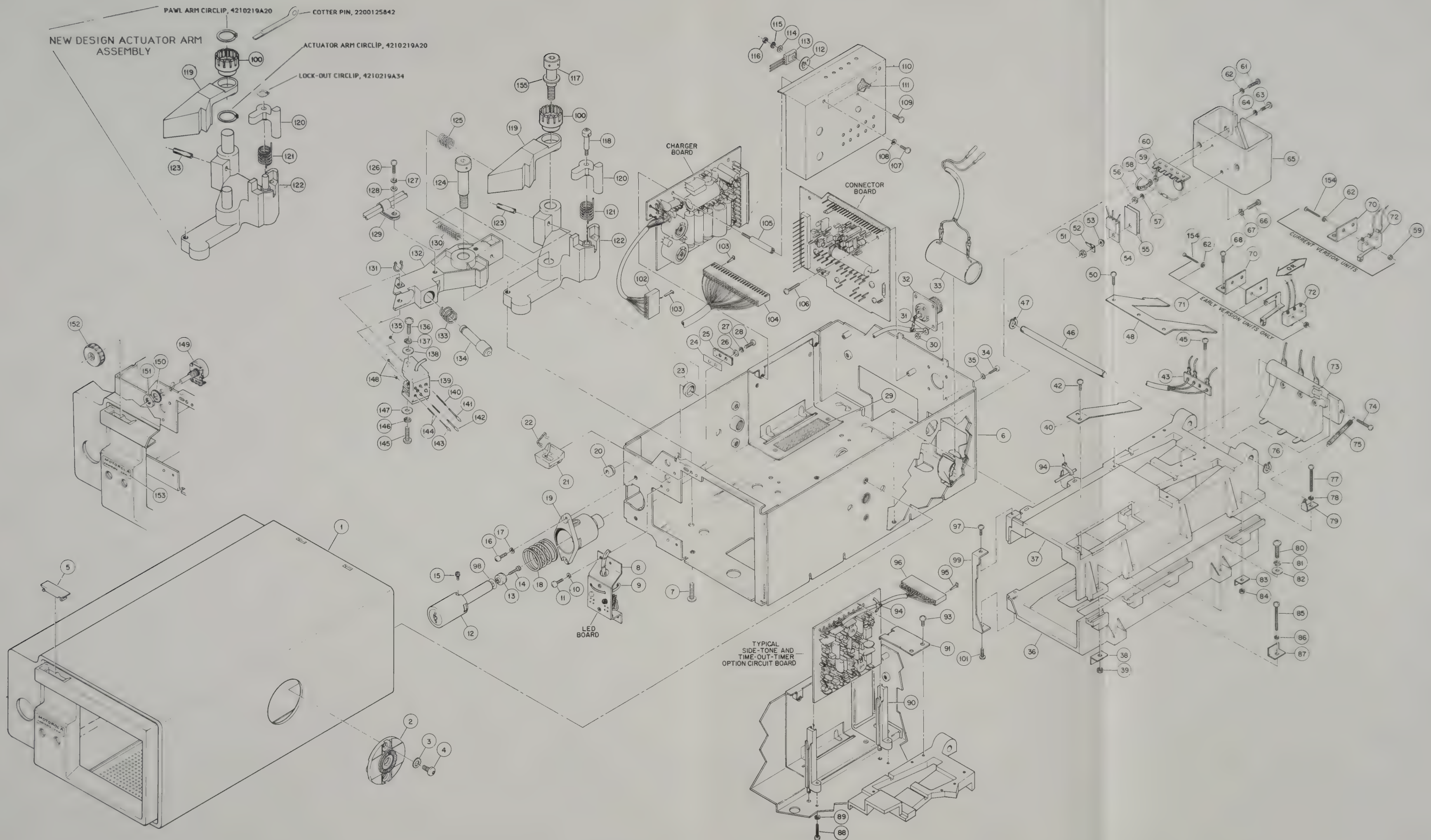
(3) Loctite thread locking compound (1110019B14) has been added to the four screws (80) retaining the pocket (36) assembly to the Converta-Com chassis (6), the two screws (136) retaining the contact block (139) assembly to the actuator arm (132), and the two screws (154) which retain the S1 switch (72) to its right-angle bracket (70). A word of caution; when applying Loctite, or any other thread-locking compound containing cyanoacrylates, care must be taken to assure none of the compound comes in contact with any plastic parts. These compounds can degrade their accompanying plastic parts, if indiscriminately used.

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# bulletin

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**PORTABLE PRODUCTS**

SRN - 1040

APC-626

October 1986

DEADLINE DATE: September 1987

**STX SYNTHESIZER UNLOCK PROBLEM**

It has come to our attention that some STX radios shipped between March 1986 and August 1986 (Serial numbers 626ALE . . . . through 626ALR . . . . ) could exhibit the problem of synthesizer unlock. This problem could also be in radios of earlier dates if the synthesizer module (U11) was replaced with a module that had a date code between week 13 of 1986 (L80 . . 8613) and week 34 of 1986 (L80 . . 8634). The date code is on top of the module can.

**Symptoms:**

The radio was working on a system, but now fails to transmit or intermittently fails to transmit (Out of range tone occurs when the PTT switch is pressed.) The radio could still receive on the system properly.

**How to test for it:**

Non-Display radio. . .When put in test mode the radio exhibits periodic unsquelching of the receiver. Due to the probability of an intermittent condition you may not see this symptom and should test as stated in **Verification of the Problem** shown below.

Display radio. . .When put in test mode, lock (LCK) indicator flashes on display and the radio exhibits periodic unsquelching of the receiver. Due to the probability of an intermittent condition you may not see this symptom and should test as stated in **Verification of the Problem** shown below.

**Verification of the Problem:**

The radio is disassembled as shown in STX Analysis Setup of Service Manual #68P81047C35-0. Measure the voltage difference between the average D.C. level at pin 8 and the D.C. level at pin 11 of synthesizer module (U11), when the radio is turned on and is in the test mode. If this difference exceeds 200 millivolts, the synthesizer module (U11) should be replaced.

In case of intermittent radios the problem is harder to isolate. The problem can be easiest found by exposing the radio to high humidity. A practical way to do this is to place the radio in a refrigerator for one hour and then remove the radio and try the above voltage difference test at room temperature. This technique produces a vapor condensation on the radio which should accentuate this problem if it exists.

### **Corrective Action:**

Any STX radio displaying this problem should have the synthesizer module (51-05706L80) replaced with a new synthesizer module (**51-05706L90**) which is part of **Kit Number RPX-4676A**.

During the first two weeks of September 1986 new synthesizer modules (**51-05706L90**) were shipped with the (51-05706L80) part number and a green or blue dot placed on the top surface next to the "r" in the word synthesizer.

### **Recommended Method of Replacing the Synthesizer Module:**

## **CAUTION**

***Do not attempt to replace the Synthesizer Module if you do not have the proper repair equipment. This can cause damage to the transceiver board. Contact your local Motorola service representative for a recommended service location or return the radio to the Motorola Repair Depot for warranty service***

## **CAUTION**

Due to the large amount of ground plane on internal layers of the transceiver board it is possible to damage the board when replacing the module. This is due to the ground planes causing the heat to transfer away from the module leads as the module is unsoldered and causing the RF board to overheat.

The **only** recommended repair procedure is to use a Motorola soldering station (01-80382A44) set to 800 degrees Fahrenheit and a Motorola PACE portable desoldering station (01-80382A31), or the Motorola PACE desoldering station (01-80333B61), at the same time to remove solder from the synthesizer module.

### **Removal Procedure**

1. Remove the metal microphonics shield from the synthesizer module and VCO.
2. Remove the solder from each of the pins and the three ground tabs on the synthesizer module (U11).
3. Remove the solder from pin 8 of the VCO module (U12).
4. Remove the VCO screws and then remove the VCO module.
5. Remove the VCO shim ( P/N 2605552Q01) and insulator (P/N 1482392E16).
6. Remove the synthesizer module (U11) with old insulator (P/N 1482392E16).

## Installation Procedure

7. Install the new synthesizer module insulator included in the RPX kit as shown in Figure One and resolder the new synthesizer module pins and ground tabs.

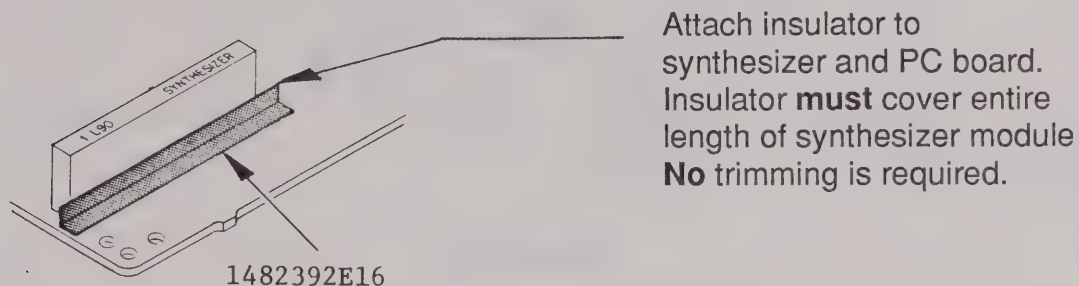


Figure One

8. Clean flux from transceiver board.
9. Install the VCO shim (P/N 2605552Q01) and insulator (P/N 1482392E16) included in the RPX kit as shown in Figure Two.

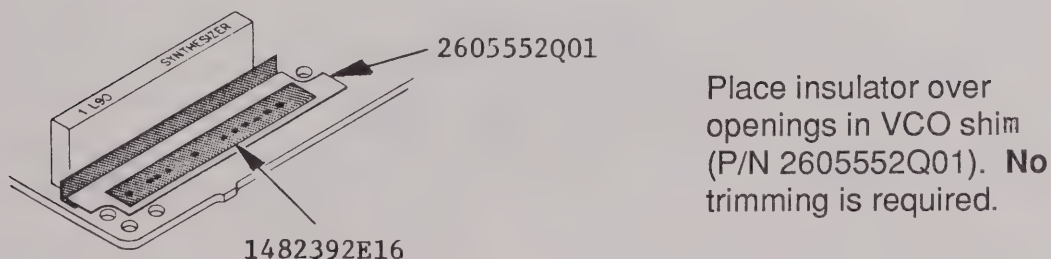
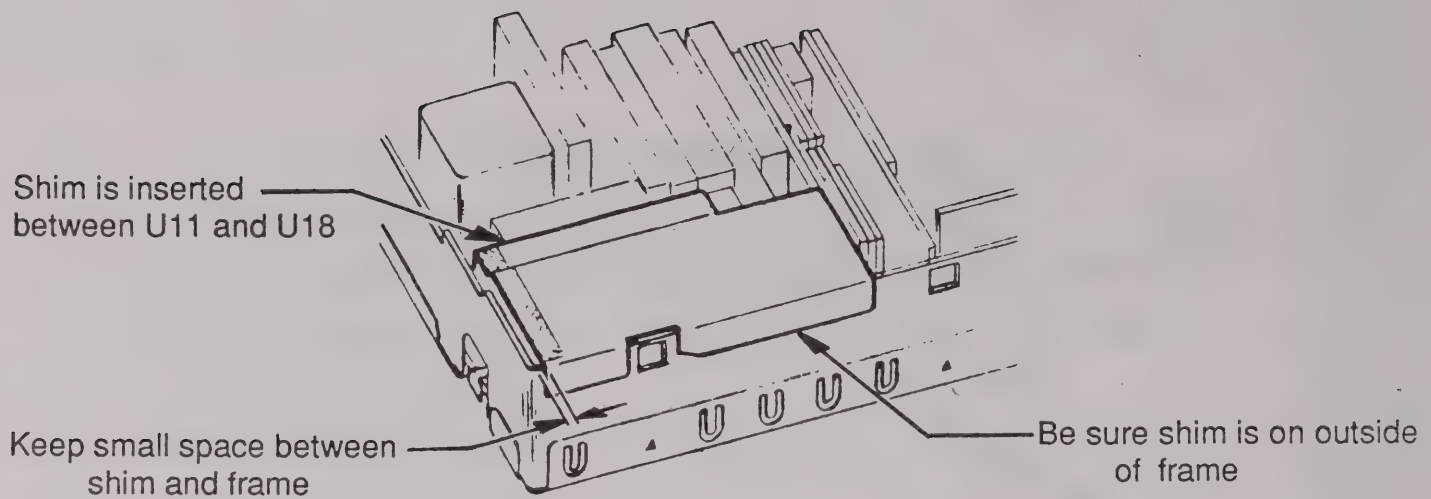


Figure Two

10. Install the VCO module, torque the screws to 2 inch pounds with Torque Screwdriver, Motorola Part number RSX-4043A, and **resolder pin 8**. These are very small screws and the correct torque is required to insure the performance of the VCO in the radio.
11. The last step is to reinstall the metal microphonics shield over the VCO and synthesizer modules. **The installation of this shield is very critical.** Please refer to figure three for proper installation technique.





**Figure Three**

Parts and one hour labor to effect this modification are covered by warranty. To obtain this modification to your equipment, contact your local service representative or Motorola Service Center to arrange modification of your equipment.

***Do not attempt to replace the Synthesizer Module if you do not have the proper repair equipment. Contact your local Motorola service representative for a recommended service location or return the radio to the Motorola Repair Depot for warranty service.***

Motorola, Inc.  
Ft. Lauderdale Service Depot  
1739 NW 38th Avenue  
Ft. Lauderdale, Florida 33311

# bulletin

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PORTABLE PRODUCTS

SRN - 1041

APC 446, 605

November 1986

DEADLINE DATE: May 31, 1987

## EXPO CHARGER STATUS LIGHT FALSING

In July 1986, the temperature window for Expo chargers was changed to improve their charge rate accuracy. In some cases, this change may result in a no light condition on insertion of the battery. Although the charger is charging correctly, the status lights may not light correctly. The single unit chargers in this group can be identified by the manufacture date code stamped on the base. Dates 2786 through 4186 single unit chargers with the following kit numbers, (NLN7175A - NLN7179A - ZLN6374A) can be exchanged through warranty through the deadline date of May 31, 1987. These chargers can be corrected by changing R-10 from 82K ohms to 47K ohms, Part No. 0600124C89; however, there is no warranty for this repair. The NLN7177A multi-unit chargers carry a month/year date stamped on the base. Manufacture dates from July 1986 through October 1986 can be corrected by changing the six R-18 75K ohm resistors to 56K ohm resistors, Part No. 0600124A91.

Parts and .5 hour labor to affect this modification are covered by warranty through the deadline date of May 31, 1987.



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PORTABLE PRODUCTS

SRN - 1042

October 1986

APC 446, 605, 629

VERY IMPORTANT NOTICE

## EXPO FM MSHA, AND UL APPROVAL

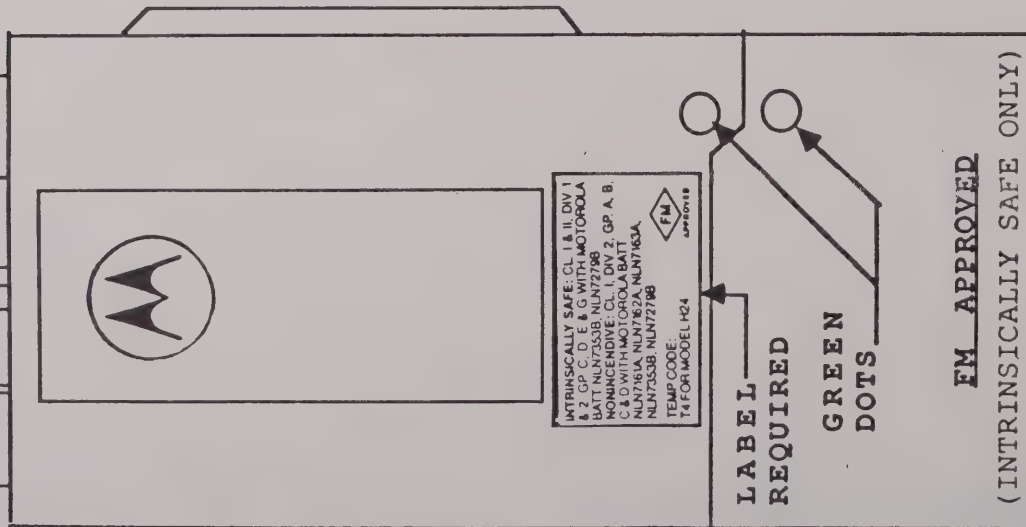
Expo radios when ordered with certain options are approved for operation in hazardous environments. The approvals are granted by FM, MSHA and UL agencies and are valid only if the label and specified battery are used and if the radio is maintained in such a way that neither the mechanical nor electrical design is altered; i.e., exact duplicate parts are used for replacement and no changes are made to the internal or external structure (both electrical and mechanical) of the radio.

The radios and batteries have been designed for ease in determining if the correct battery is being used with the radio for a given agency approval. Sketches of the radio, battery and label combinations are shown on Page 2.

This bulletin is for information only and does not imply or offer any warranty consideration.



# FM APPROVAL

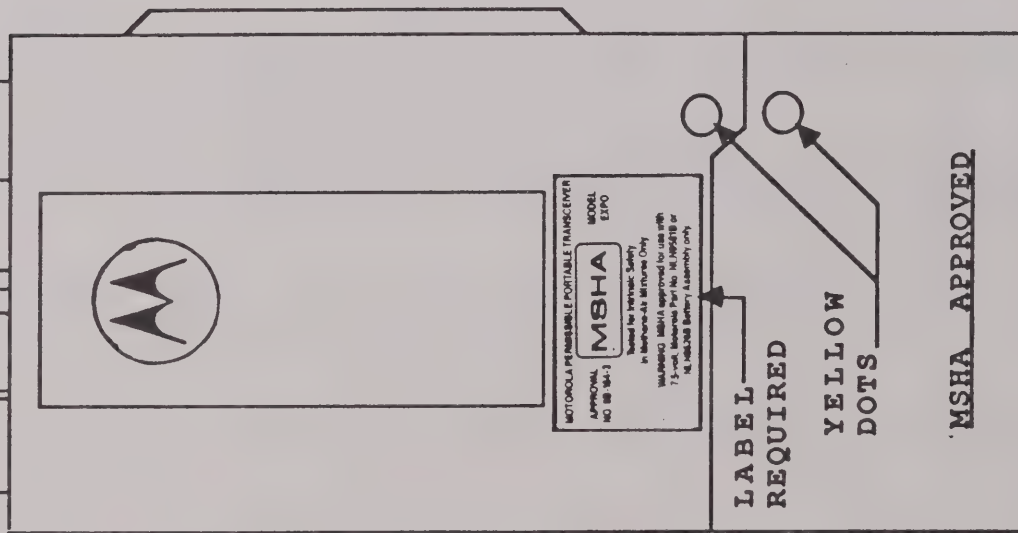


**RADIO OPTION NUMBERS:**  
 H753 (LIGHT DUTY) or  
 H753 AND H226 (MED. DUTY)

**BATTERY KIT NUMBERS:**  
 NLN7353B (LIGHT DUTY) or  
 NLN7279B (MED. DUTY)

**COLOR OF DOTS - GREEN**

# MSHA APPROVAL

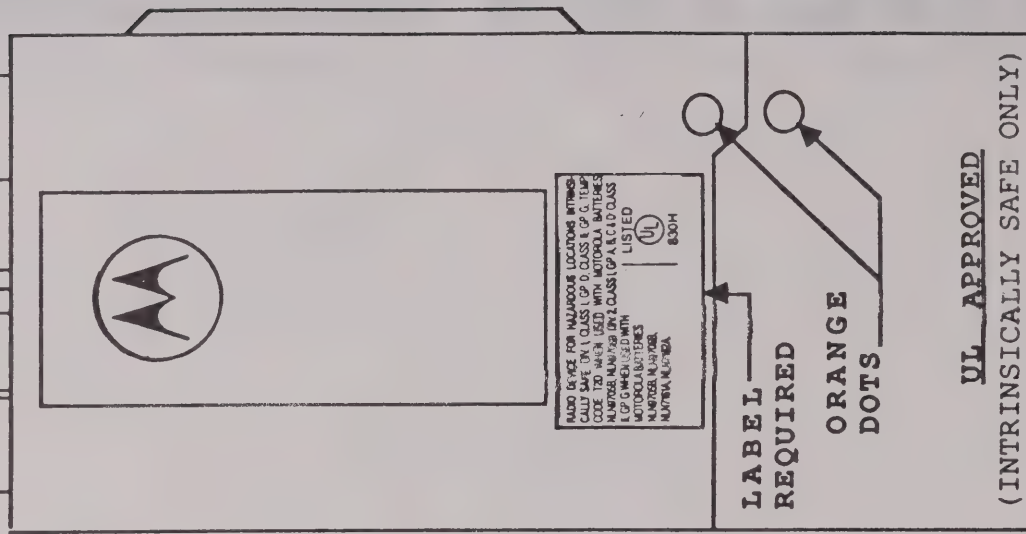


**RADIO OPTION NUMBERS:**  
 H751 (LIGHT DUTY) or  
 H751 AND H226 (MED. DUTY)

**BATTERY KIT NUMBERS:**  
 NLN9561B (LIGHT DUTY) or  
 NLN9562B (MED. DUTY)

**COLOR OF DOTS - YELLOW**

# UL APPROVAL



**RADIO OPTION NUMBERS:**  
 H200 (LIGHT DUTY) or  
 H219 (MED. DUTY)

**BATTERY KIT NUMBERS:**  
 NLN9705B (LIGHT DUTY) or  
 NLN9706B (MED. DUTY)

**COLOR OF DOTS - ORANGE**



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# bulletin

## ROUTING

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SRN-1043

December, 1986

APC-201, 301, 486, 586

Deadline Date: 10/1/87

SUBJECT: FUSE KIT FOR *Micor* HIGH POWER BASE STATIONSMODELS AFFECTED: All low band, high band, and UHF *Micor* High Power Base Stations

KITS AFFECTED: TPN1131A and TPN1147A High Voltage Power Supplies

Problems have been reported with the 1500-volt power supplies used in high power *Micor* Base Stations. Shorting of either the 1500-volt or 300-volt winding on the transformer causes the transformer to fail and the station to become inoperable. Also, the diode bridge rectifier on the 300-volt winding may be marginal.

To resolve the problem, the rating on the diode has been increased and fuses have been added in both the 300-volt and 1500-volt windings as precautionary measures.

An RPX4707A modification kit is available from your local Motorola Parts Office to correct this problem. The modification kit is available at no charge until October 1, 1987. Reference must be made to this SRN bulletin.

Power supplies experiencing this problem can be repaired by an authorized Motorola Service Shop. Labor not to exceed 1 hour, plus travel charges can be charged to warranty using the standard warranty procedure.

All power supplies now shipped from the factory include these modifications.

## KIT REQUIRED

MOTOROLA NO.  
RPX4707A

DESCRIPTION  
Modification Kit

\*USER PRICE

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.



# bulletin

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## PORTABLE PRODUCTS

SRN - 1044A

February 1987

APC 429, 479, 527, 570, 620

## MEMORY MODULE AND PROGRAMMING CHANGE FOR MX-S, MX-R and PX-S

MEMORY MODULE:

There has been a recent change in the manufacturer of the prom used in the MX300S, MX300R and PX300S memory modules. Due to some internal differences in the modules the kit numbers have been changed. The numbers are:

<u>Discontinued Blank Module</u>	<u>New Blank Module</u>	<u>Discontinued Factory Programmed Module</u>	<u>New Factory Programmed Module</u>
RPX-4416A	RPX-4454A	NLN5096A	NLN5096B
RPX-4418A	RPX-4455A	NLN7302A	NLN7302B
RPX-4419A	RPX-4456A	NLN7303A	NLN7303B
RPX-4650A	RPX-4457A	NLN5096ASP04	NLN5096BSP04
RPX-4651A	RPX-4458A	PLN1167A	PLN1242A
RPX-4652A	RPX-4459A	PLN1209A	PLN1243A

The new memory module has been shipping in all radios since approximately 1/15/87. Once programmed, the new and discontinued version memory modules are completely interchangeable within the MX300 and PX300 products.

PROGRAMMING:

The new "B" version memory modules require a new programming adapter board and software for use with the R1801A and R1821A Digital Analyzers/Controllers.

Adapter board RTL5805C Replaces RTL5805B.

Programming Kit RTL4809C (Software Version F) replaces all previous programming kits and software versions. The specific software version (A-F) contained within the analyzer/controller is indicated on the display following entry of the program name. Alternatively, the programming kit suffix (A-C) can be found on the label of the application program prom within the analyzer/controller.



The new programming kit and adapter board can program both new and discontinued versions of the memory module. The new memory module can only be programmed by the new programming kit and adapter board.

**WARNING**

Programming of the new memory module with the old programming kit and adapter board will destroy the memory module.

The new blank memory modules, programming kit and adapter board are available from C & E Parts.

This bulletin is for information only. No warranty consideration is expressed or implied.

# bulletin


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## ROUTING

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SRN-1045

April, 1987

APC-494

Deadline Date: N/A

SUBJECT: *STARPOINT* 23 AD Added Fuse Protection and Power Converter Replacement

MODELS AFFECTED: K02CBD1103A *Starpoint* 23 AD w/Duplex Operation  
 K02CBD1105A *Starpoint* 23 AD w/Simplex Receive  
 K02CBD1106A *Starpoint* 23 AD w/Simplex Transmit

KITS AFFECTED: MLN1101A Digital Interface Unit, -48 V dc (old)  
 MLN1143A Digital Interface Unit, -48 V dc (new)  
 MPN6029A Power Converter

In order to improve serviceability to the *Starpoint* 23 AD indoor unit chassis, a fuse for the power converter was added to the rear panel of the chassis. A 20 amp fuse on the power converter circuit board with a 6 amp fuse added in series to the rear panel now protects the power converter. If a fuse blows it should be the readily accessible one on the rear panel.

If replacement of the power converter becomes necessary and is to be installed in older indoor chassis without the rear panel fuse, the 20 amp fuse as shipped from the factory is too large to provide adequate protection. Therefore; when replacing an MPN6029A Power Converter check the chassis number. If the chassis is an MLN1101A, a 6 amp fuse must be installed on the power converter circuit board. If the chassis is an MLN1143A, then a 20 amp fuse should be installed on the power converter circuit board and a 6 amp fuse must be installed in the rear panel fuseholder.

## PARTS REQUIRED

## MOTOROLA

## PART NO.

6500135013

0103484A07

## DESCRIPTION

Fuse, 20 amp; 125 V

Fuse, 6 amp

## \*USER PRICE

\$3.13 pk of 5

\$1.36 each

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price—Subject to change without notice.



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PORTABLE PRODUCTS  
SRN - 1046  
APC-626  
DEADLINE DATE: July 1988

## PREMATURE BATTERY ALERT PROBLEM

It has come to our attention that some STX radios exhibit a premature low battery alert under normal operating conditions as specified in the service manual. This problem is not always caused by STX batteries. We do not recommend battery changes until the radio is properly tested. Radio test processes to identify the problem are provided in this document.

Prior to performing the tests for premature low battery indication, it is necessary to verify that the radio does not contain excessive internal voltage drops. The procedure for testing for excessive internal voltage drops is provided. Component changes recommended in this bulletin should not be used to correct this condition.

### Symptom:

Low battery indication within a few hours after a fully charged battery is placed in service.

### Test Procedure for Excessive Internal Radio Voltage Drops:

Refer to the **STX Test Setup** diagram in the STX Service Manual.

1. Place the radio on battery block (RTL-4199A).
2. Set the variable power supply to 7.5 VDC. Verify voltage setting with DVM.
3. Enter the radio **Test Mode** function.
4. Activate the transmitter by pressing PTT. Note that the radio has attained the specified RF power output with 7.5 VDC.
5. Disconnect the radio test box from the radio accessory connector (J601). With a DVM, measure the switched supply voltage on pin 5 of J601.
6. Press PTT and note the switched supply voltage (J601-5). This reading should be 7.2 VDC or greater. If less than 7.2 VDC is measured, the radio has excessive internal voltage drop. Follow the recommended procedure to identify and correct the problem outlined below.



### Troubleshooting Procedure for Excessive Internal Voltage Drop:

If the internal radio voltage drops are greater than 0.3 VDC, Step 6 above will result in a voltage reading of less than 7.2 VDC (J601-5). Perform the following sequence:

1. Make sure that the base-plate and battery contact screws are tight. Repeat Step 6 above.
2. Check the B+ voltage path on the transceiver PCB for higher than normal path resistance (greater than  $0.3\Omega$  for the entire path). Defective components should be replaced. If the transceiver PCB is found to contain runners with excessive resistance, the transceiver PCB should be replaced. Repeat Step 6 above.

### Test Procedure for Premature Low Battery Alert:

Refer to the **STX Test Setup** diagram in the STX Service Manual.

1. Place the radio on battery block (RTL-4199A).
2. Adjust variable power supply to 6.3 VDC. Verify voltage setting with DVM.
  - a) Display radio . . . The "BATT" indication should be displayed. Press PTT, "BATT" indication will remain. Release PTT. An audible tone (chirps) should be heard on the radio speaker.
  - b) Non-display radio . . . Press PTT. Release PTT. An audible tone (chirps) should be heard on the radio speaker.

If the radio does not indicate low battery condition as described above, the radio's low battery detect circuit is non-functional. Please troubleshoot the low battery detect circuitry as indicated in the STX Service Manual.

3. Set the variable power supply to 6.9 VDC. Verify voltage setting with DVM.
  - a) Display radio . . . The "BATT" indication should be off. Press PTT, "BATT" indication must not be displayed. Release PTT. No audible tones (chirps) should be heard on the radio speaker.
  - b) Non-display radio . . . press PTT. Release PTT. No audible tones (chirps) should be heard on the radio speaker.

If the radio indicates low battery condition while performing the test described in Step 3, the radio is exhibiting a premature low battery indication. To correct the problem, please change the resistor(s) on the corresponding controller board indicated below. Please refer to the STX Service Manual for component locations. After modifications are implemented, repeat step 3 above.

NTN-4497A, B or C . . . . . Change R444 to P/N 06-60079K12 (91 K $\Omega$ ).

NTN-4769A . . . . . Change R443 to P/N 06-60079L15 (137 K $\Omega$ ) and  
Change R444 to P/N 06-60079J99 (71.5 K $\Omega$ )

Parts and one-half hour labor to effect this modification are covered by warranty. To obtain this modification for your equipment, contact your local service representative or Motorola Service Station to arrange modification for your equipment.

# bulletin

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## PORTABLE PRODUCTS

SRN - 1047

APC-230, 411, 422, 476, 477

OCTOBER, 1987

## MT500 AND HT90/440 FUSE REPLACEMENT

Whenever replacement of the 2 amp fuse (P/N 6505214E01) on the battery supply line is necessary, it is recommended to use a 3 amp fuse (P/N 6505214E07). Portables shipped from the factory now use the 3 amp fuse in the current build.

Current spikes close to or greater than the current rating of the fuse are caused by installation of the battery while the portable is turned on. Changing of the fuse value eliminates fuse failures in the portable that a cause cannot be identified. This change also does not reduce or risk the protection of the portable.

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## PORTABLE PRODUCTS

SRN - 1048

APC-446

November, 1987

DEADLINE DATE: March, 1988

## EXPO UHF DESENSE PROBLEM

UHF Expo radios shipped in August, 1987 may have the speaker bracket soldered to the frame, Figure 1. Current shipments contain ground contact clip (P/N 3905827Q01), Figure 2. This is to prevent PL desense for radios with the following options:

NLN7166A (Tone PL Deck)

NTN4454A (2 TPL Slave Deck)

NLN7171A (SELCALL with Transmit Only TPL Deck)

Verification of Problem: Key the unit up against a ground plane (i.e., metal desk) and monitor demodulated PL tone on a service monitor. There should be no change in the amplitude or frequency of the PL tone.

Soldering of the speaker bracket from the frame was only an interim fix and should not be performed by a service technician. When servicing a radio which has this condition, follow the steps in the order listed below.

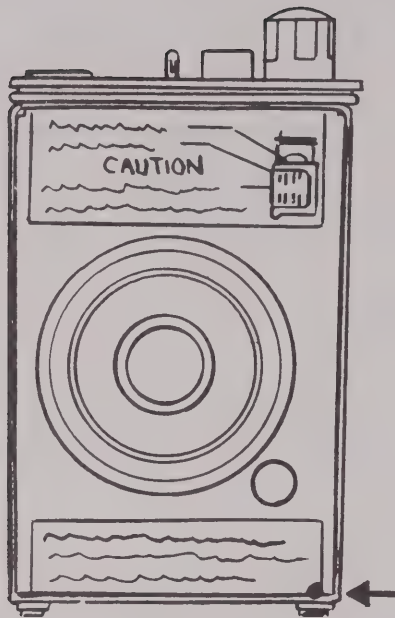
- (1) Desolder the speaker bracket from the frame.
- (2) Perform any repair/maintenance required on the unit.
- (3) When step 2 has been successfully completed, place ground contact clip (P/N 3905827Q02) over the oscillator cans as shown in Figure 2 and solder clip in place.
- (4) Remove the foam and adhesive on the speaker bracket as shown in the crossed hatched area in Figure 3. Ensure that all of the adhesive is removed from the crossed hatched area to ensure good ground contact with the clip.
- (5) Clean off solder in the area where the speaker bracket and frame were previously connected.
- (6) Reassemble the speaker bracket to the radio. Do not solder the speaker bracket to the frame.
- (7) Place the assembled radio into the housing per standard procedure.
- (8) Verify that there is no PL desense in the radio as described above.

Page 1 of 2

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

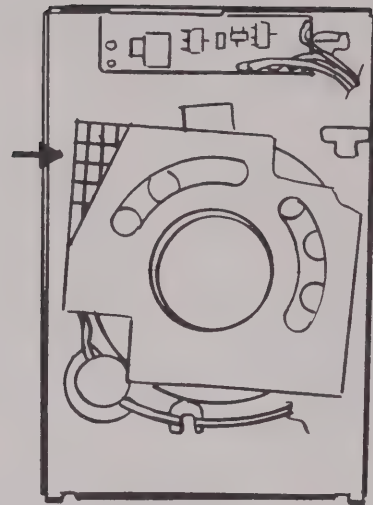
Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.





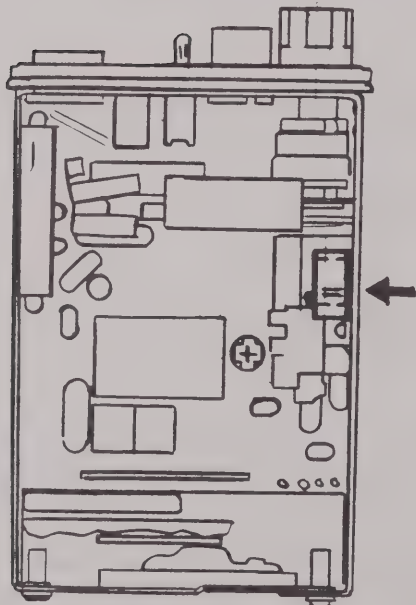
SPEAKER BRACKET SOLDERED TO FRAME

FIGURE 1

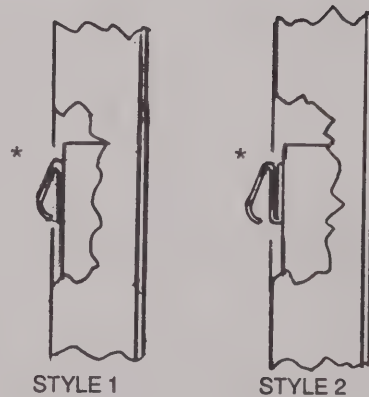


REMOVE FOAM AND ADHESIVE IN CROSS HATCHED AREA

FIGURE 2



CLIP POSITION AND SOLDER POINT



\* SIDE VIEW OF CLIP  
BOTH STYLES CAN BE USED AND ARE THE SAME PART NUMBER

NOTE - SOLDER ONLY AT EDGE OF CLIP TO ENSURE SPRING ACTION IS NOT RESTRICTED

FIGURE 2  
PAGE 2 OF 2

This SRN is for information only and does not offer any warranty labor consideration. The clip is available upon request at no cost from C & E Parts.

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PORTABLE PRODUCTS

SRN-1049

November 13, 1987

APC 649, 651

DEADLINE DATE: March 31, 1988

## HT600 CLONING

MODELS AFFECTED: UHF and VHF models built prior to August 7, 1987 and units after that with controllers date coded prior to 8733.

It has been discovered that a significant number of HT600 units are not able to complete the cloning process. This condition occurs when the master radio (unit containing the information to be transferred) does not initiate the cloning procedure due to an incorrect error message in its self diagnostics. Diode P/N 4805494Q04 or 48082363E03 must be added from the **LOCK-DETECT** line to the monitor line on the controller, to correct this condition. (See attached diagram and disassembly/assembly instructions for modification details).

The date code of the controller flex can be found on those units built after August 1, 1987 by removing the front cover and looking at the (carrier, flex top). Reference Item 7 of the exploded part view of the Service manuals 68P81045C25 and 68P81045C20.

Parts and 1/2 hour labor for installation are available under warranty. To obtain modification, contact your local Motorola Service Representative or Motorola Service Station.

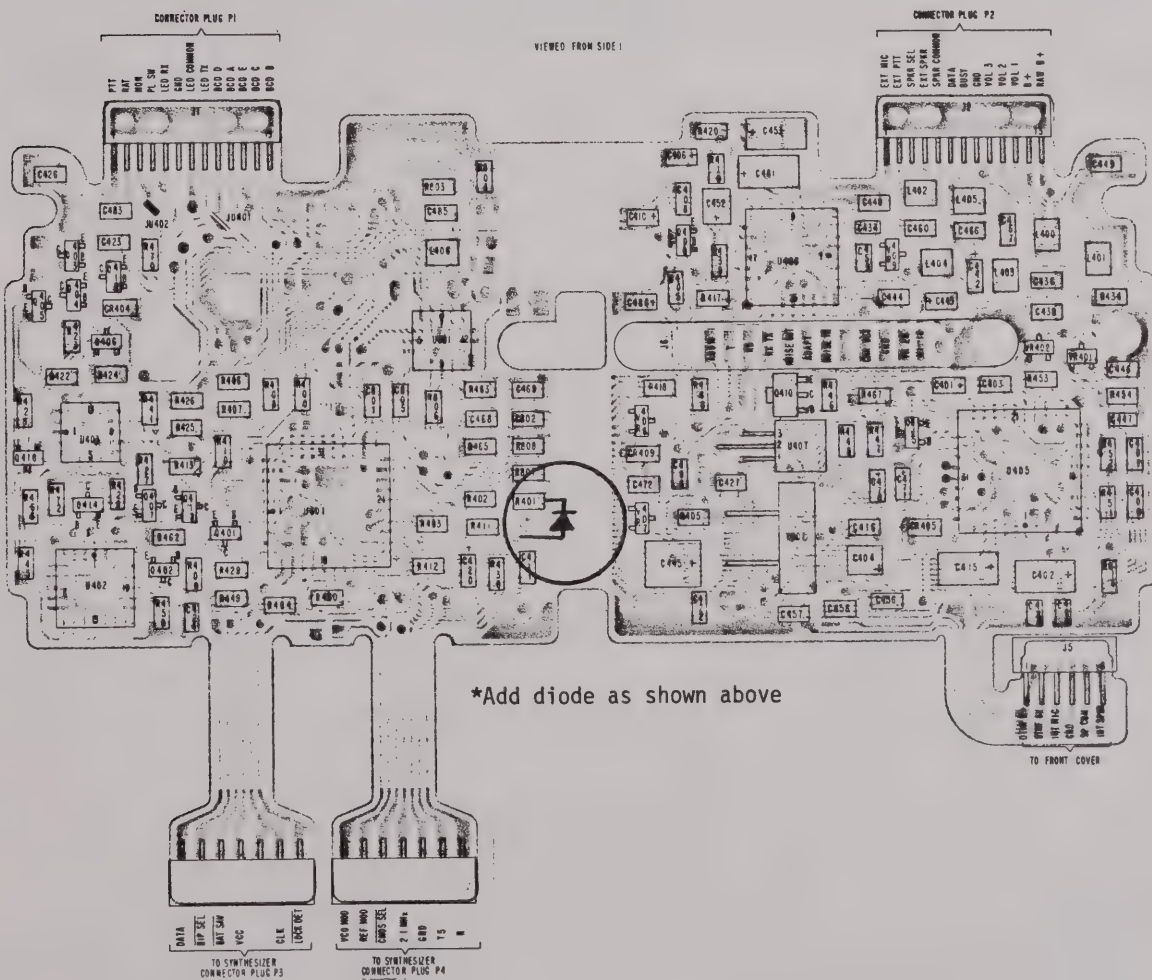
### RADIO MODIFICATION PROCEDURE

1. Remove the two screws from the back of the radio.
2. Remove the two screws on the bottom of the radio (baseplate corners).
3. Lift the front cover from the housing, being careful not to pull against the speaker/microphone wires.
4. Disconnect the speaker/microphone connector from the controller flex by grasping the sleeved wires (near the plug) and pulling the plug straight out and away from the circuit board.
5. Loosen the two captive screws on the bottom of the radio. Do not completely remove the captive screws from the baseplate.
6. With a thumb and forefinger, grasp the antenna at its base and pull lightly to remove the frame assembly from the radio housing.
7. Remove the screw that secures the front shield to the controller carrier.
8. Remove the front shield by pulling it straight out and away from the radio.
9. Remove the four screws (two on each side) that secure the controller carrier to the frame.
10. Disconnect the two bottom flex connectors by carefully sliding them away from the synthesizer.
11. Lift the controller circuit (nearest the bottom of the radio) away from the radio just enough to gain access to the connector under the controller.
12. Disconnect the connector under the controller.
13. Disconnect the two connectors at the top of the controller.
14. Lift the controller assembly totally away from the radio.
15. Remove the screw and washer that secure the bottom shield to the top flex carrier.
16. Along the top edge of the controller assembly (edge nearest speaker clearance indentation), gently pry the bottom shield away from the top flex carrier.

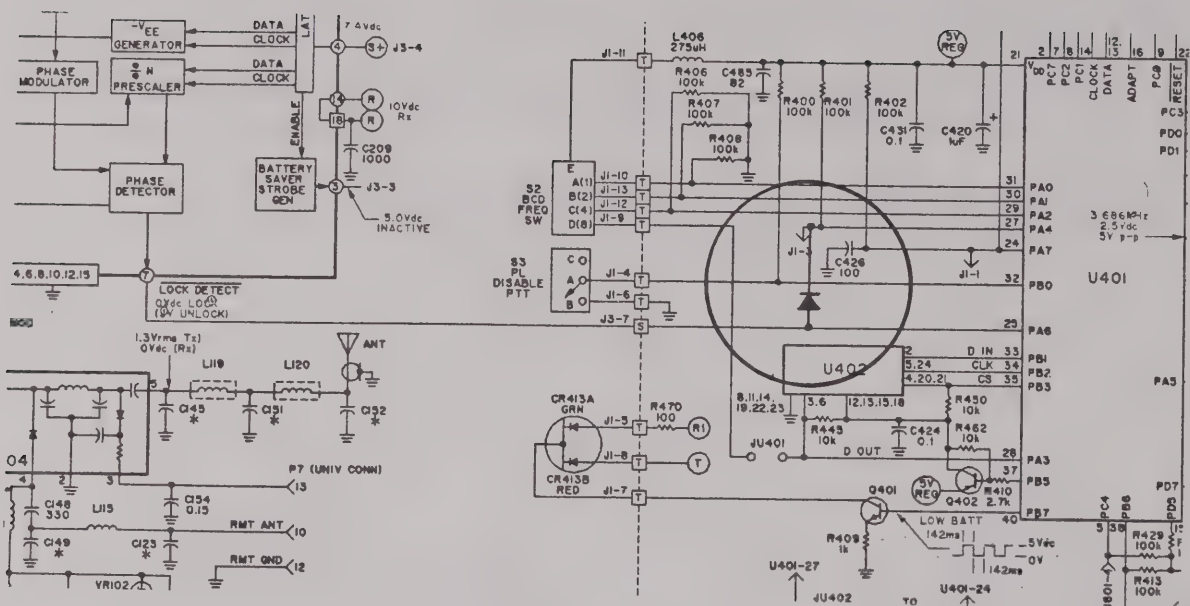
## RADIO MODIFICATION PROCEDURE (CONT'D)

**\*NOTE:** Refer to the controller overlay in the Service Manual to complete the modification procedure.

18. With a blade, gently remove the solder resist from the solder pad on the LOCK-DETECT line (as shown in the attached diagram).
19. Solder chip diode (P/N 4805494Q04 or P/N48082363E03) between the LOCK-DETECT line (anode) and the MONITOR line (cathode) (as shown in the attached diagram).
20. Reassemble radio by following the above procedure in the reverse order.







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## PORTABLE PRODUCTS

SRN-1050

APC 719

November, 1987

## PORTA-PAK CONTROL BOX NTN4764A

To prevent the headset jack (P/N 0905925Q01) on the control box (NTN4764A) from becoming loose after a period of time, a thread locking compound has been set up and is now used in current shipments.

The thread locking compound is available from:

C. & E. Parts as P/N 11S10035A17

or

Parks Corporation

Shellac - 1 pint container

Vendor Part Number 0336

(Other brands have not been approved)

To apply, use an artist paint brush or cotton swab and put a small amount of thread locking compound on the threads of the jack prior to installation of the nut. Be careful not to get any compound into the jack. Assemble the jack into the insert and tighten the nut to 2.5 in-lbs before the liquid dries. The thread locking compound will dry within the hour.

NOTE: Use of other thread locking compounds may cause degradation of the surrounding plastic surfaces.

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## PORTABLE PRODUCTS

SRN-1051

November 13, 1987

APC 446, 605, 719

## EXPO NUT ASSEMBLY

During reassembly of the Expo antenna bushing nut, RF jack nut, or universal connector nut use thread adhesive after tightening the nut to specification.

The thread locking adhesive is available from:

C. & E. Parts as P/N 11S10019B14

or

Loctite Corp.

Newington, Conn.

Nutlock - TL242 (BLUE)

Application of a small amount of adhesive after nut assembly will wick between the threads to increase nut retention. Removal of the nut for future disassembly purposes is still possible.

Assembly torque specifications are:

	Torque (in-lbs)
Antenna Bushing Nut	12.0
Antenna Jack Nut	3.0
Universal Connector Nut	6.0

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PORTABLE PRODUCTS

**SRN-F1052**

February, 1988

## STATIC CONTROL EQUIPMENT FOR SERVICING "ESD" SENSITIVE PRODUCTS

By now, all of us are aware of the dangers that electrostatic discharge (ESD) can have on the products we service. As you may recall, you need a static potential of at least 4,000 volts to feel the discharge and 10,000 volts to see it. But did you know that with the advent of microtechnology, electronic components can be damaged or destroyed by ESD voltages as low as 20 volts.

Fortunately with an effective static-safe work area, repair returns can be reduced to less than 1%. By the implementation of the following equipment (which is the minimal static control equipment for service shop work stations), you will save money and improve customer/service shop relationships.

Below is a list of static control equipment specifically related to servicing portables. Nevertheless, it also applies to servicing other products, but may not cover all their particular requirements.

### STATIC CONTROL EQUIPMENT FOR EACH WORK BENCH:

Part Number	Description
01-80386A82	Anti-Static Kit (includes the next five items)
66-80387A95	Replacement 2' X 4' Static Control Table Mat, includes Ground Cord
66-80387A96	Replacement 4' X 6' Static Control Floor Mat, includes Ground Cord
66-80387A97	Floor Mat Ground Cord, 15'
66-80334B36	Table to Floor Mat Ground Cord, 10' with Clip
42-80385A59	Conductive Wrist Strap, 5' Coil Cord
66-80388A75	Rigid Static Control Table Mat

### STATIC CONTROL EQUIPMENT FOR SERVICE SHOP WORK AREA:

Part Number	Description
01-80371B20	Air Ionizer - static eliminator with a heater and variable fan control.
Model CP912	Air Ionizer- available from Charleswater Products, Inc.; 93 Border St.; West Newton, MA 02165 (617) 964-8370

### STATIC CONTROL EQUIPMENT FOR ON-SITE SERVICING:

Part Number	Description
01-80371B21	Static-Dissipative Field Service Kit (3M Model 8501)

### STATIC CONTROL EQUIPMENT FOR SOLDERING/DESOLDERING:

Part Number	Description
RSX-4057A	Surface Mounted Component/IC Removal/Rework Station* (117VAC)
RSX-4058A	Surface Mounted Component/IC Removal/Rework Station* (220VAC)
01-803282A44	Digital Readout Soldering Station (117 VAC)
01-803282A45	Digital Readout Soldering Station (220 VAC)
RSX-1008A	Zero Voltage Soldering Station (117 VAC)
RSX-1008A/240V	Zero Voltage Soldering Station (240 VAC)
01-80386A81	Miniature Digital Readout Soldering Station (117 VAC)
01-80386A86	Miniature Digital Readout Soldering Station (220/240 VAC)
01-80382A57	Cordless Solder Iron (117VAC)
01-80382A58	Cordless Solder Iron (220VAC)
01-80333B61	Power Desoldering and Soldering System (117VAC)
01-80333B62	Power Desoldering and Soldering System (220VAC)

\*Accessories must be ordered separately.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.





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**PORTABLE PRODUCTS****SRN- 1053****APC-230,330,411,  
422,511****JANUARY, 1988****REVISION "H" 5105177D23 PL PROCESSOR FOR MT500**

A REVISION "H" MODULE IS NOW BEING MANUFACTURED. IT IS COMPATIBLE WITH ALL PREVIOUS REVISIONS, BUT IT IS SLIGHTLY TALLER. THIS COULD CAUSE AN INTERFERENCE ON SOME MODELS OF MT500 WHEN REPLACING THE MODULE ON THE PL DECK.

ON ALL NON-TOUCHCODE FRONT COVERS, IF AN INTERFERENCE OCCURS, THE INTERFERENCE CAN BE ELIMINATED BY PERFORMING THE REWORK DESCRIBED ON PAGE 2.

ON TOUCHCODE ANI VERSION MT500'S, MOUNT THE DECK SO THAT THE MODULE TOP POINTS AWAY FROM THE FRONT COVER. IF AN INTERFERENCE WITH ANOTHER OPTION OR THE BACK COVER OCCURS, CONTACT PRODUCT SERVICES (305) 475-6170.

THE TALLER MODLE CAN BE IDENTIFIED BY THE LETTER "H" STAMPED ON THE TOP AND SIDE OF THE CAN. THE STAMP WILL READ "D23 H".

THIS SRN IS FOR INFORMATION ONLY AND NO WARRANTY PARTS NOR LABOR IS OFFERED.

PAGE 1 OF 2

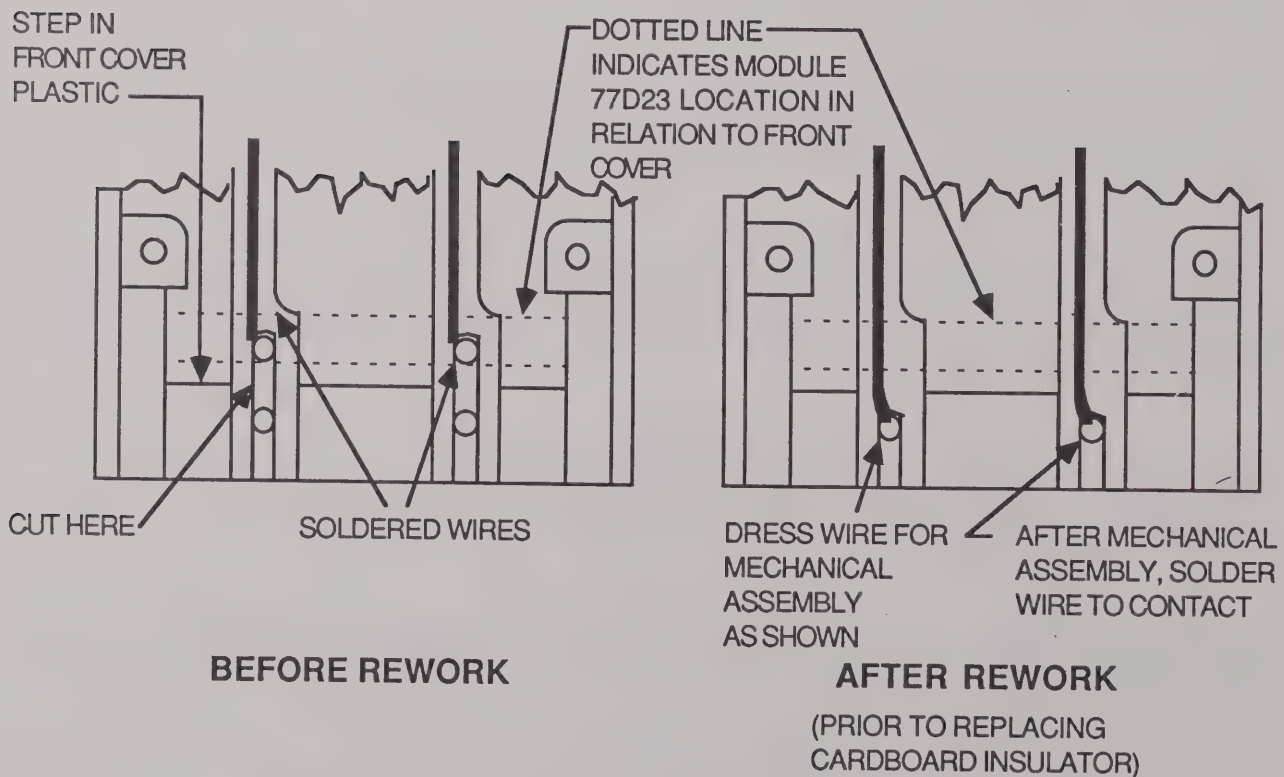
If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.



## REWORK PROCEDURE FOR MT500 FRONT COVER WHEN PL PROCESSOR 5105177D23 CAUSES INTERFERENCE.

1. REMOVE THE CARDBOARD INSULATOR COVERING CONTACT STRAPS AT THE LOWER END OF THE FRONT COVER, ABOVE THE BATTERY COMPARTMENT.
2. UNSOLDER AND REMOVE BOTH LEAD WIRES FROM THE TWO CONTACTS.
3. CUT BOTH CONTACTS SO THAT THE END HOLE OF EACH IS REMOVED TO THE VISIBLE EDGE OF A RAISED STEP IN THE FRONT COVER PLASTIC. (SEE DIAGRAM BELOW).
4. REDRESS AND SOLDER BOTH WIRES TO THE SAME CONTACT STRIPS THEY WERE REMOVED FROM AND INTO THE REMAINING HOLE IN THE CONTACT STRIPS.
5. REPLACE THE CARDBOARD INSULATOR.



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Portable Products

SRN - 1054 A

APC 626

Deadline Date: July 1989

## STX Audio Howl Issue

It has come to our attention that some radios shipped before October 1, 1986 could exhibit an audio howl problem if water were to get in the radio side connector, J601. With water in this connector, the radio will howl as long as the volume control is turned to greater than half volume, although the radio may still be able to transmit and receive in this condition.

### Models Affected

H25JNB5170AN	H35STC5170AN	H25TJB5170AN
H25JNB5170BN	H35STC5170BN	H25TJB5170BN
H35JNB5170AN	H25STD5170AN	H35TJB5170AN
H35JNB5170BN	H25STD5170BN	H35TJB5170BN
H25JNC5170AN	H35STD5170AN	H25TJC5170AN
H25JNB5170BN	H35STD5170BN	H25TJC5170BN
H35JNC5170AN	H25STE5170AN	H35TJC5170AN
H35JNC5170BN	H25STE5170BN	H35TJC5170BN
H25STC5170AN	H35STE5170AN	
H25STC5170BN	H35STE5170BN	

NOTE: "C" model radios do not exhibit this problem.

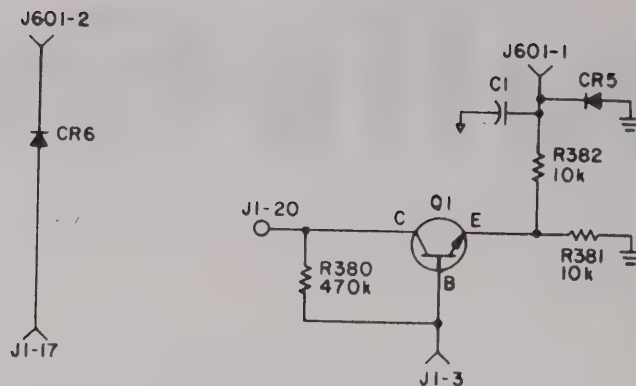
Verification of Symptom: Verify that the radio exhibits a howl problem by first putting the radio into test mode, then adding tap water into the radio side connector, J601, with the radio at full volume.

Recommended Rework: Replace the standard control top with the corresponding SP control top.

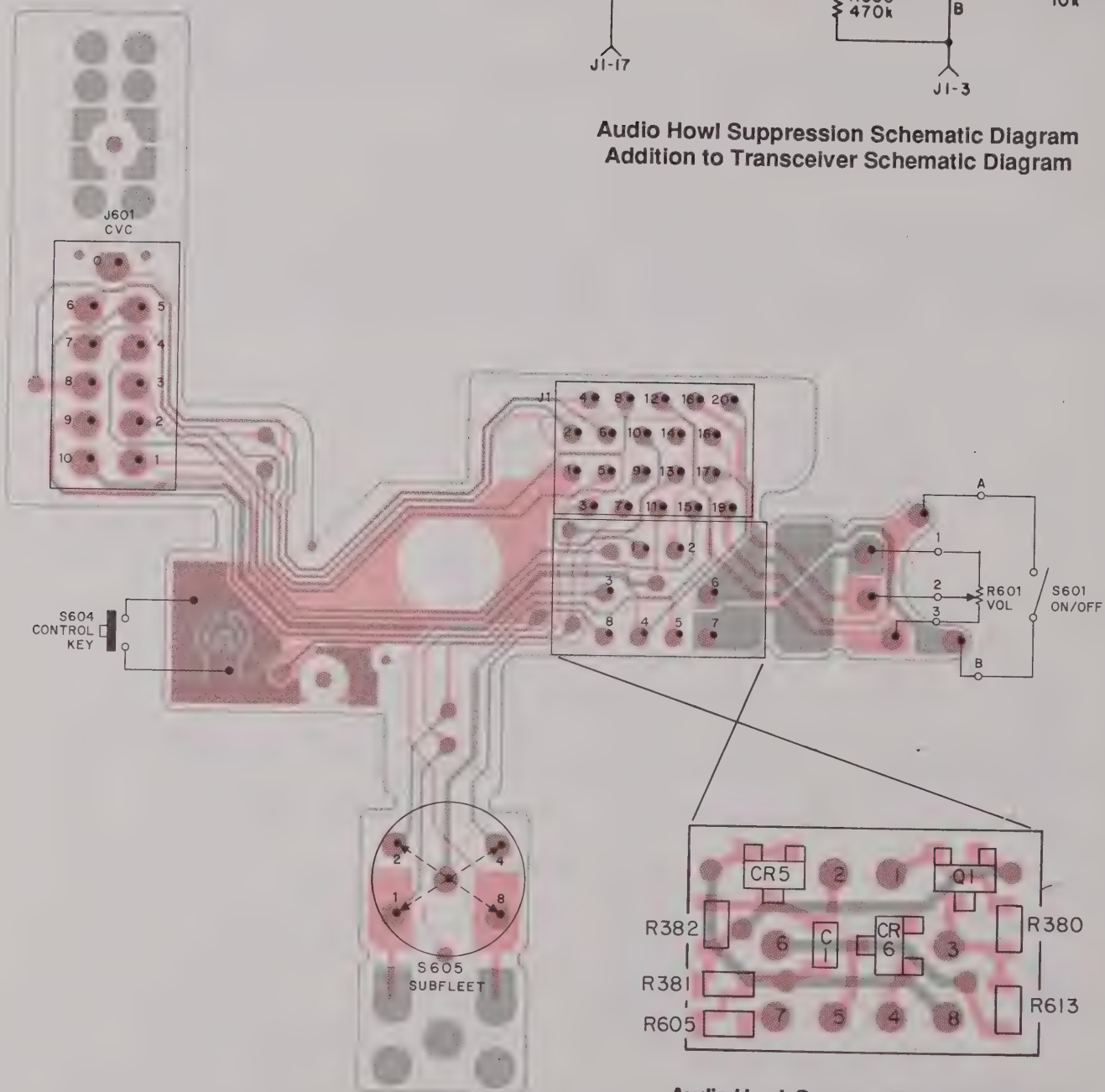
### Control Top Kit Information

<u>Description</u>	<u>Standard Kit #</u>	<u>SP Kit #</u>	<u>SP Flex #</u>
Display Only (No Rotary)	NTN-4335B	PLN-7332B	01-07709A40
16-Position Rotary	NTN-4338B	PLN-7335B	01-07709A39
8-Position Rotary	NTN-4337B	PLN-7334B	01-07709A38
2-Position Rotary	NTN-4336B	PLN-7333B	01-07709A37

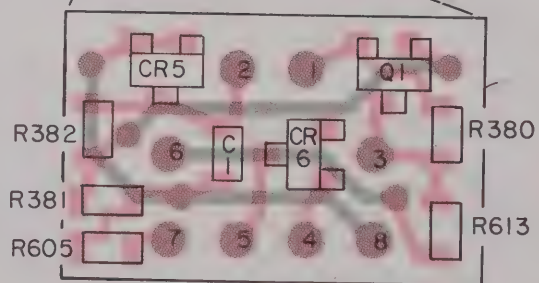
Parts and one-half hour labor to effect this modification are covered by warranty. To obtain this modification to your equipment, contact your local service representative or Motorola Service Center to arrange modification of your equipment.



**Audio Howl Suppression Schematic Diagram  
Addition to Transceiver Schematic Diagram**



**Control-Flex Printed Circuit  
Viewed From Component Side**



**Audio Howl Suppression Circuit Board  
Viewed From Component Side**



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**PORTABLE PRODUCTS****SRN - 1055A****APC - 402****MAY, 1989****HT90/440 RAPID CHARGE BATTERY CHARGERS POCKET FUSES****SINGLE UNIT CHARGERS NLN7646A AND NLN7648A:**

SINGLE-UNIT RAPID CHARGER BATTERY CHARGERS (NLN7646A & NLN7648A) WITH A DATE CODE PRIOR TO APRIL 89 HAVE THE WRONG FUSE FOR F2. THAT FUSE TENDS TO BLOW THEREBY CAUSING THE RED LED TO STAY ON EVEN WITH NO BATTERY INSIDE THE CHARGER POCKET. IF FUSE FAILURE OCCURS, THE PROPER REPLACEMENT IS A 1 AMP, SLOW BLOW FUSE (P/N 6500132937). **WARNING:** DO NOT REPLACE FUSE WITH JUMPER.

**MULTI-UNIT CHARGER NLN7966B:**

NLN7966B MULTI-UNIT CHARGERS SHIPPED PRIOR TO FEBRUARY 1988 COULD HAVE 1 AMP FUSES WIRED TO EACH CHARGING POCKET CIRCUIT. THE CURRENT BUILD OF THE CHARGER DOES NOT INCLUDE THE FUSE. IF A PROBLEM SHOULD OCCUR WITH THE FUSES BLOWING, THEY CAN BE REMOVED WITHOUT DECREASING THE OPERATIONAL SAFETY OF THE UNIT. **SEE DIAGRAM #1**

PAGE 1 OF 2



REMOVE FUSE FROM WIRE AND INSERT THE WIRE DIRECTLY TO THE POINT THE FUSE WAS REMOVED FROM.

### MULTI UNIT CHARGERS ONLY

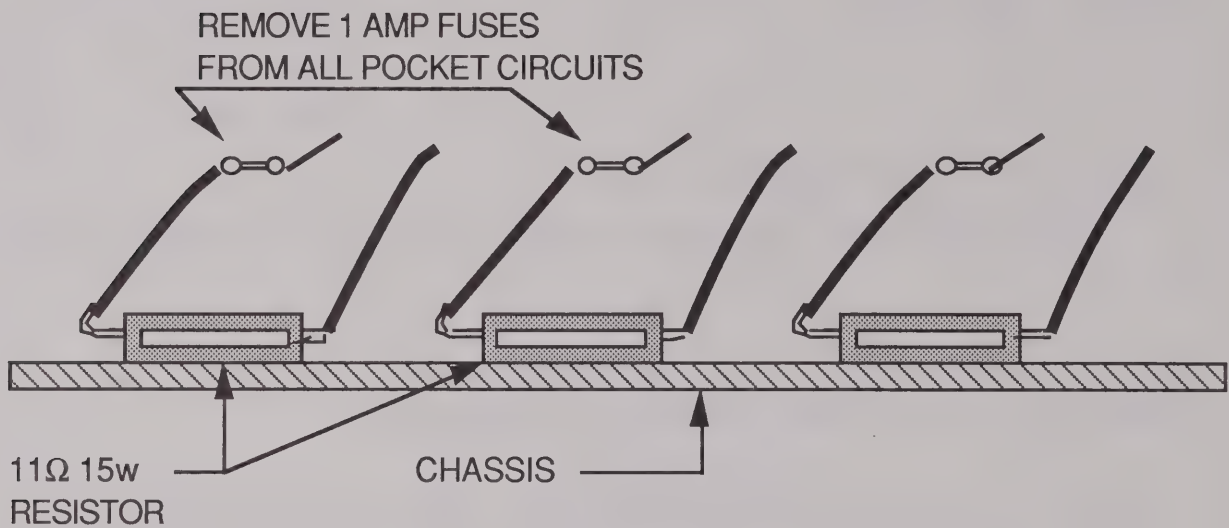


DIAGRAM #1

THIS SRN IS FOR INFORMATION ONLY AND NO WARRANTY PARTS NOR LABOR IS OFFERED.

**PORTABLE PRODUCTS****SRN- 1056A****APC- 446, 605****AUGUST, 1988****EXPO VOLUME POT REPLACEMENT**

A SLIGHT DIMENSIONAL CHANGE OF THE CURRENT VOLUME POT (1805734G07) THAT IS NOW SHIPPING, MAKES ASSEMBLY OF THE POT TO THE DRIVE BUSHING (4305242L01) DIFFICULT ON UNITS SHIPPED PRIOR TO DECEMBER 31, 1987.

A KIT NUMBER **REX4013A** CONSISTING OF A VOLUME POT (1805734G07) AND A DRIVE BUSHING (4305242L02) SHOULD BE ORDERED WHEN REPLACING THE VOLUME CONTROL ON EARLIER VERSION RADIOS.

FOR IDENTIFICATION PURPOSES, THE OLDER BUSHING (4305242L01) IS BLACK IN COLOR, WHILE THE NEW DRIVE BUSHING (4305242L02) IS WHITE.

**CAUTION:** THE BUSHING CLIP (4205810L01) FROM THE OLD ASSEMBLY, OR A NEW ONE, MUST BE PUT ON THE NEW VOLUME CONTROL TO INSURE THE MECHANICAL RELIABILITY OF THE PART.

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# bulletin

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## ROUTING

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SRN-1057  
April, 1988  
APC-486  
Deadline Date: N/A

SUBJECT: PURC PAGING BASE STATION MODEM DELAY MODULE

MODELS AFFECTED:	B84JZB1101	C64JZB1101
	B91JZB1101	C71JZB1101
	B93JZB1101	C73JZB1101
		C75JZB1101

The delay issue relates to the UDS202T Modem (Models TDN6869 and TDN6870) used in PURC Paging Base Stations in Simulcast Systems. The UDS202T Modem was redesigned into a smaller package resulting in a reduction in delay of data passing through the modem. Simulcast systems in which overlapping transmitters use different versions of UDS202T Modems will experience unequal delays for binary paging only on the order of 400 microseconds. This delay cannot be compensated by changes to the delay line setting without adversely affecting analog delay compensation.

A compensation module, QRN4612A Delay Module, has been designed for use with the new (smaller dimensions) UDS202T modem. New station orders for existing systems should be reviewed by the procedure described below. If delay modules are determined to be necessary, order a Delay Module, QRN4612A, as a separate line item with each new station requiring the modem delay. The price for the delay module is \$96.00.

The procedure for determining the quantity of compensation modules needed in an existing system is as follows:

1. Identify whether existing transmitters are equipped with new (smaller) UDS modems or old (larger) modems. If your system has new modems, no delay module is required.
2. If the system contains older modems, for each new transmitter, determine if it provides overlapping coverage with any transmitters that use older (larger) UDS modems. If so, the new station's modem requires a compensation module.
3. If possible, re-distribute modems in the system to avoid overlapping conditions identified in Step 2.
4. If that cannot be done, order the SP option with the station.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price — For domestic use only and subject to change without notice.





# bulletin

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**PORTABLE PRODUCTS****SRN-1058****APC- 426, 471, 571,****654, 655, 656, 657****MAY, 1988****SABER General Service Information Bulletin****Models Affected:**

This information applies to all Saber radios.

**Alternate Frequency and ON/OFF/Volume Knob Options**

Some customers feel the standard On/Off/Volume and Frequency knobs are too easy to adjust and may get caught on clothing. Low profile knobs are available which are less susceptible to inadvertent turning.

The low profile knobs can be ordered under the following kit numbers and are compatible in every way with all existing radio assembly/disassembly procedures:

REX4016A

On/Off/Volume low profile knob kit

REX4017A

Frequency low profile knob kit

**Ordering Replacement Housing Kits**

The replacement housing assembly kits listed in the Saber service manuals do not come with the following parts which must be ordered separately:

<u>Description</u>	<u>Part/Kit Number</u>
Lever, PTT	4505022P02
Label, nameplate (Saber II/III)	3305183R02
Label, top nameplate (Saber I)	3305183R01
Label, bottom nameplate (Saber I)	3305183R03

The issue X clear radio service manuals (P/Ns 68P81043C90-X and 68P81043C95-X) incorrectly list the parts that are included with the housing kits, however this information is correct in the issue O clear radio service manuals (P/Ns 68P81043C90-O and 68P81043C95-O). The issue O secure radio service manuals (P/Ns 68P81045C70-O and 68P81045C75-O) are correct as amended by FMR1313-3 and FMR1322-3.

**New Torque Driver Bit For Antenna Bushing Nut**

The 6680370B90 torque driver bit specified in all Saber service manuals for use with the antenna bushing slotted-spanner nut (P/N 0205765L02) does not accommodate slotted-spanner nut (P/N 0205591R01) which is used on newer radios. A new torque driver bit P/N 6680371B34 is available which works with both slotted-spanner nuts and is fully compatible with all other Motorola radio products that previously specified the 6680370B90 driver bit.

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If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

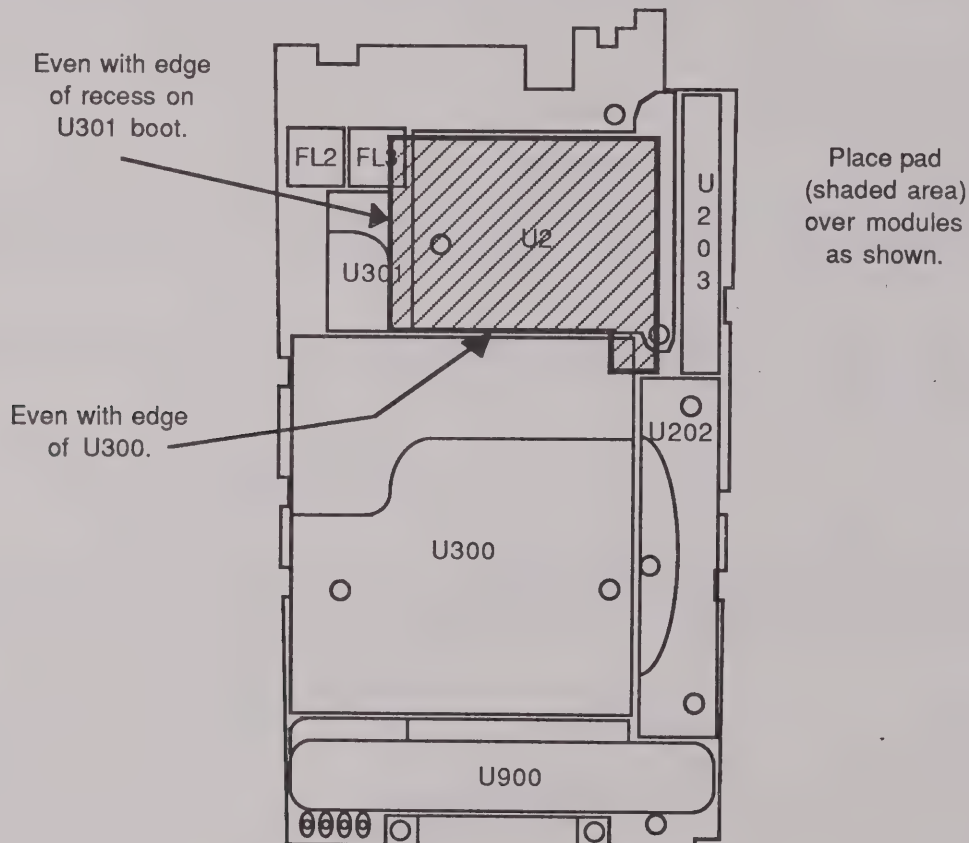
Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

**Models Affected:**

This information applies to all secure Saber II and III radios.

**Different Shock Pad For Secure Radios**

There is a shock pad located between the LCD printed circuit board assembly and the modules in all secure Saber II and III radios. The pad part number is incorrect in issue O secure service manual 68P81045C70-O ( Manual 68P81045C75-O is correct; manual C70-O was corrected by FMR1322-3). Should a shock pad for a DVP radio need replacement it should be ordered as kit #NTN5421A and adhered to the tops of the modules as shown in the diagram below. When replacing radio modules, ensure that the shock pad is reinstalled.



\*\*\*\*\*

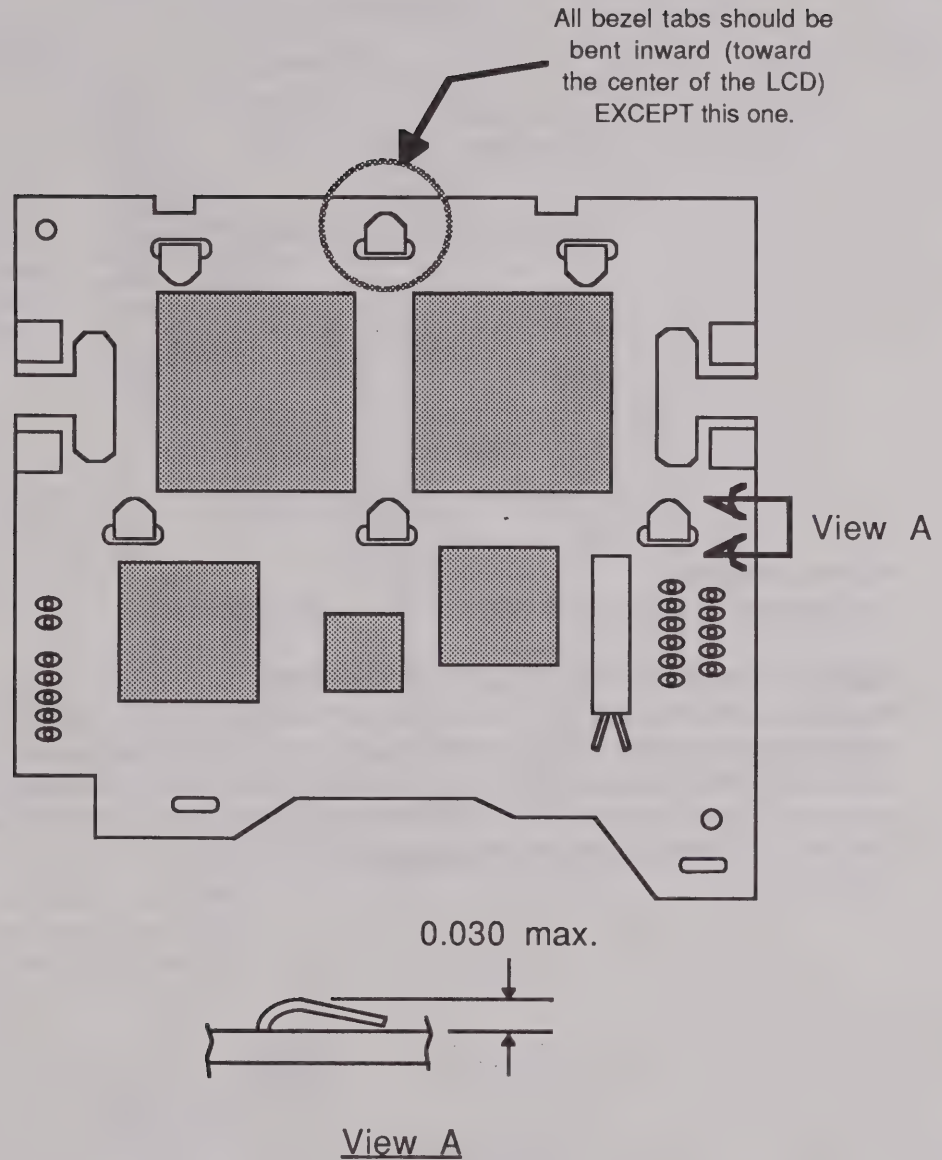
**Models Affected:**

This information applies to all Saber II and III radios.

**LCD Bezel Tab Positions to Reduce Chance of Shorts**

If the LCD bezel tabs on the Saber display board assembly are not bent in the proper directions shorting can occur between the tabs and the controls flexible circuit. When repairs must be made on this board assembly, make sure that the LCD bezel tabs are bent over in the configuration shown in the diagram **A**.

## DIAGRAM A



\*\*\*\*\*

### Models Affected:

H33 and H43 Models with signaling options.

### Insulator Used to Reduce Chance of Possible Short

It is possible under unique conditions for a short to occur between U300 and the test pads under U300. If a radio exhibits signaling problems, the insulator described below should be cut from a roll of polyimide tape (P/N 1110033F19) and positioned onto the main PC board as shown in the diagram **B**.

#### Dimensions

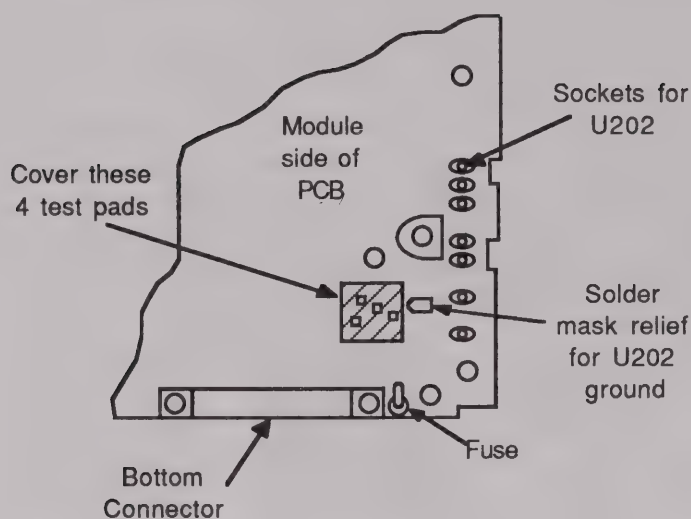
.20 x .25

#### Symptom

Improper signalling



**DIAGRAM B**



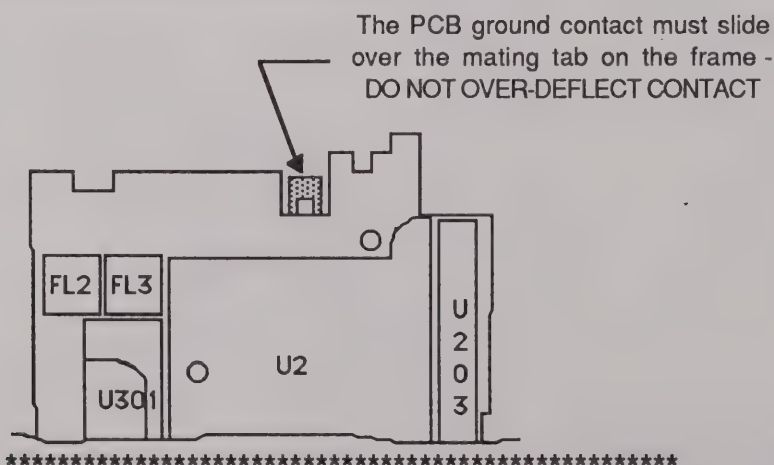
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**Models Affected:**

This information applies to all H33 and H43 model Saber radios.

**PC Board Ground Contact Insertion Precautions**

All H33 and H43 model Saber radios have a PC board ground contact (P/N 3905889R01) which makes electrical contact to a tab on the frame under the control top panel. This contact can fracture if excessive force is applied to it during insertion of the PC board assembly into the frame assembly. If abnormal resistance is observed during insertion, check the alignment of the PC board slots and the frame tabs to ensure they are mating properly.



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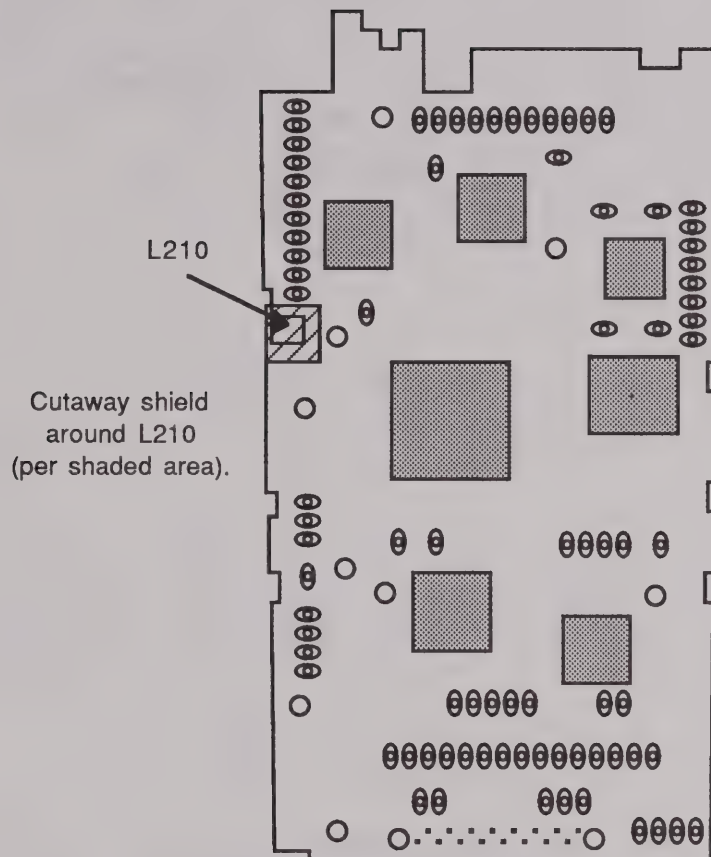
**Models Affected:**

This information applies to all H34 and H44 model secure Saber radios.

**Back Shield Modification to Improve L210 Drop Protection**

Some secure radios were shipped with a slot in the back shield to prevent interference with L210 on the main printed circuit board as shown in the diagram below. If the back shield on these radios must be replaced then the new back shield must be cut away in the area around the inductor as shown below. On newer PC boards L210 is not positioned close to the edge and no modifications are necessary. See diagram C.

### DIAGRAM C



\*\*\*\*\*

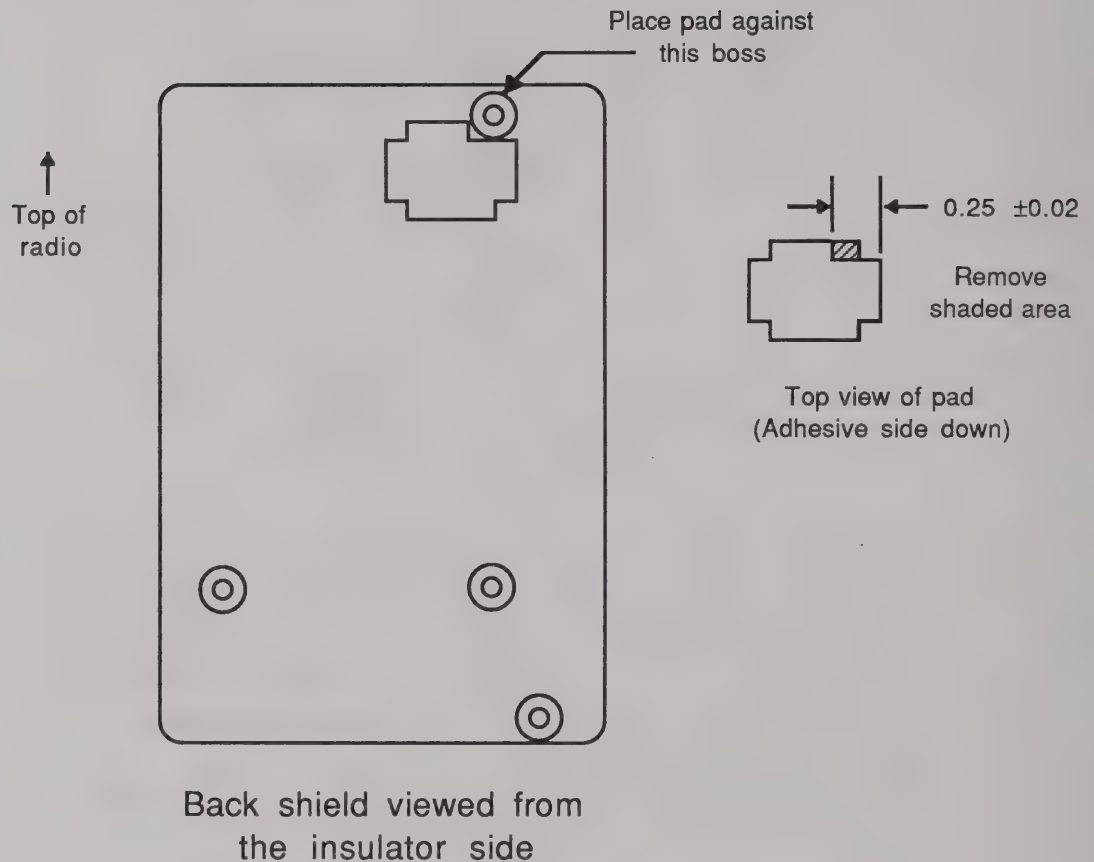
#### **Models Affected:**

This information applies to all H34 and H44 model Saber radios.

#### **Back Shield Pad to Protect UHF Front End Module (U2) Guide Pins**

All H34 and H44 model Saber radios contain a receiver front end module (U2). The two guide pins on this module may fail when the unit is subjected to high levels of shock in a unique orientation. Additional protection can be provided by adding a pad to the back shield above the module guide pins as shown in the diagram D. The pad used is P/N 7505934Q01 modified as shown diagram D.

### DIAGRAM D

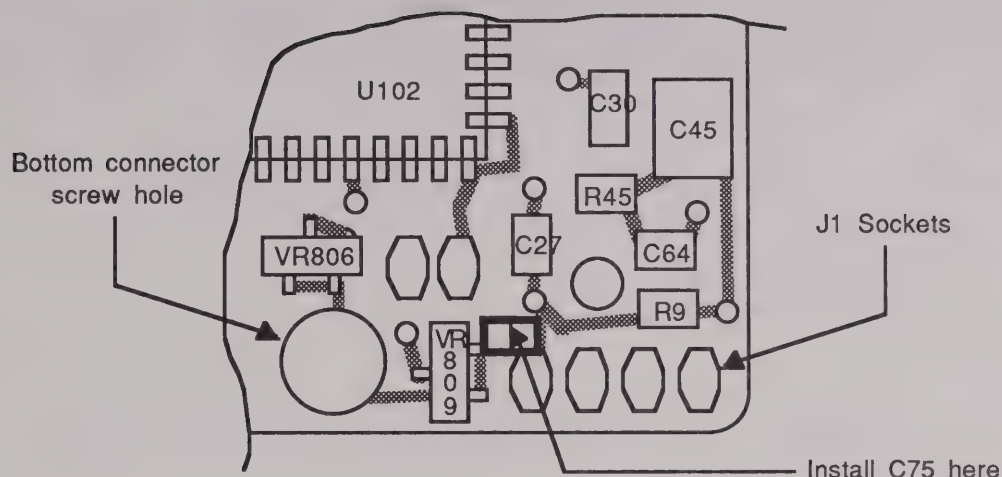


#### Correction for UHF Saber transmitter deviation problem

An issue has been identified that affects a small number of UHF Saber portables. Transmitter deviation has been found to be very low in these radios when held very close to the face in a normal position for use. This is the result of RF desensitization causing a reduction in the microphone output to the audio IC. An RF decoupling capacitor has been added on all current and future production radios; this information is detailed below and in diagram **E**.

Added: C75 100 pF, 5% chip capacitor  
Motorola part number 2160520G01

### DIAGRAM E



Bottom right corner of  
main PCB as viewed  
from back (IC-side)

Installation of the capacitor is between socket J1-4 and the ground (2 lead) side of VR809 on the main PC board (see diagram). This component should be installed on any UHF radios not having the component from the factory; when in for any service requiring removal of the radio from the housing. Note as above, most radios will exhibit no problem.

\*\*\*\*\*

#### Models affected:

H43SAN7139A, H43SAJ7139A, H43SAK7139A, H43YBN7139A

#### Field replacement of the VHF Saber synthesizer module U300

This notice accompanies the NLD8210A VHF VCO/synthesizer module. This module is the correct replacement for the following:

NLD8202A (5105144J77)	VCO/synthesizer	146-162 MHz.
NLD8210A (5105144J79)	VCO/synthesizer	157-174 MHz.

The NLD8210A is tunable across the 146-174 MHz band; the NLD8202A is discontinued. When replacing an NLD8202A (44J77) module with the NLD8210A (44J79), it is important to use field programmer software of Revision **R01.01.00 or later** for radio programming. Both high-power radio models in the bandsplits above now use the NLD8210A and have been revised to 'B' models at the factory; these models are listed above. The field programmer listed will also prompt the user to verify an 'A' model and mark the label to a 'B' model when replacing the VCO/synthesizer module. The low-power radio model currently uses the NLD8210A and is not affected.

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any warranty consideration.





# bulletin

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**PORTABLE PRODUCTS****SRN- 1059****APC- 649, 651, 653****SEPTEMBER, 1988****HT600 RADIO AND ACCESSORIES COMMON PROBLEMS**

TO: All Service Shops and Field Technicians

FROM: HT600 Engineering Group

The following is a list of symptoms and troubleshooting suggestions to isolate some of the most common failures and problems found in the HT600 radios.

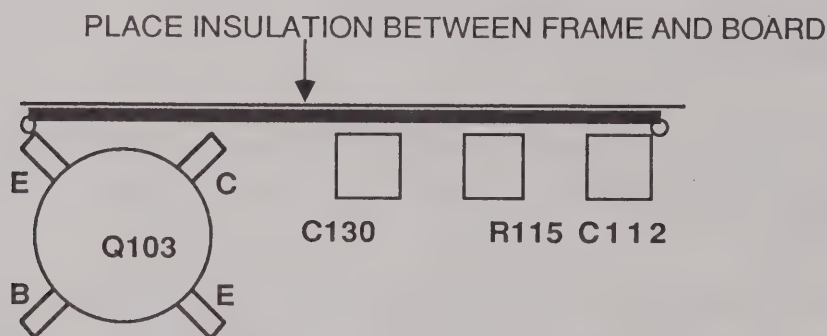
- 1. No transmit deviation:** Check to see if deviation is present at the remote port. If so, most likely the problem is a bad mic or a pinched or broken wire/connection in the front cover wire harness. If no deviation at either port, trace the audio signal to pin 1 of the VCO. There is a ferrite chip inductor here on UHF models that could be open circuited.
- 2. RF power at the remote port but no range or power out of the antenna:** Check the rf connection to the mother board for broken solder-- usually a drop related failure. Boards manufactured after October 1987 have different type connections and are not subject to this problem.
- 3. High standby current and no tx power out:** Seen mostly in high power UHF units and is usually the result of a partially shorted PA. Customer may complain of low battery life. A dead short normally blows the fuse. Check RF PA (U102).
- 4. Constant transmit:** The most common cause for this is a shorted C426 located in the upper left hand corner of the controller flex. Also check continuity between pins 4 and 5 on the control top. This should be a very high dc resistance,  $\approx 20K$  ohms. A cracked or shorted C302 (located on the flex attached to the frame) may cause the same problem.

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Page 1 of 8

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

**5. Noisy Tx signal:** This may occur on some high power UHF boards when an unusually large pressure is applied to the PTT switch. This is the result of momentary contact between the frame and a ground to ground jumper from the emitter of Q103 to either R115 or C112. In most cases, the problem can be alleviated by slipping a piece of insulating tape (Part NO. 1405209I02) between the frame and the rf board (as shown on the diagram). It may be necessary, however, to remove the rf board in order to properly insulate the frame. (Radios shipped after April 1988 will not have the jumper or will be properly insulated prior to shipment). On all other radios this problem may be the result of loose or missing screws, mangled shields, or anything else that could cause some type of metal on metal movement.



**6. Intermittent noise in Rx (Even with high rf levels):** This can be caused by noise in either the first or second injection sources. First injection problems are rare but can be verified by presenting a large rf signal (0dBm) at 53.55 MHz at the remote port. If the noise is no longer present the problem is due to noise on the first injection and the fix is to replace the VCO module. If the noise is still present inject a large 450KHz signal at the M1 point. If no noise is present then it is a 2nd injection problem and the fix is to replace the synthesizer module. This can also be due to loose or moving parts causing metal to metal movement.

**7. Low/no audio:** Due sometimes to intermittent solder around the audio filter IC (U405). May be corrected by reflowing this area. In most cases is due to open circuit speakers. Typical resistance is  $\approx 40$  ohms. Radios built after 4/1/88 will measure  $\approx 30$  ohms.

**8. Radio is dead or squeals:** Two of the symptoms of a bad reference oscillator. Typical current  $\approx 40$  ma, if no squealing is present.

**9. Radio will not program with battery:** This occurred in a few early models and the cause was an intermittent control head ground connection. To correct this, a redundant ground wire was added from pin 5 of the control head to chassis ground. (Radios that shipped after 6/27/87 will have this ground wire already installed).

**10. Radio will not clone:** On earlier versions (UHF and VHF models built prior to August 7, 1987 and units after that with controllers date coded prior to 8733) a hardware fix is required to prevent a condition that occurs when the master radio does not initiate the cloning procedure due to an incorrect error message in its self diagnostics. Diode P/N 4805494Q04 or (48082363E03) must be added from the LOCK DETECT line to the MONITOR line on the controller, to correct this condition. (See diagram below for modification details).



**11. Poor Rx Sensitivity on some channels:** Most likely due to computer noise and interference. Can be verified by turning off all computers close by (if possible) or tuning on another frequency. This problem is rarely noticed in the field but occurs during bench testing of VHF units with the computer interface connected.

**12. Constant green flashing light when in the PL mode:** This can usually be corrected by increasing the squelch attenuator setting. Early models were set at quieting levels of 6-8 dBQ. Increasing to 10-12 dBQ will most likely correct the flashing light problem.



**13. VHF Unlock on particular frequencies:** Problems may occur in the following frequencies intervals:

Tx	Rx
150.2 $\pm$ .75MHz	150.95 $\pm$ .75MHz
155.2 $\pm$ .75MHz	155.35 $\pm$ .75MHz
160.7 $\pm$ .75MHz	159.85 $\pm$ .75MHz

The problem is due to a faulty VCO/Synthesizer interaction and can be fixed by replacing the VCO.

**14. Unsymmetrical Deviation:** This problem may be seen on radios manufactured during the first quarter 1988. Incorrectly biased electrolytic capacitor will be noticed in bench testing only (ext mic.), and can be corrected by changing C405 from .47 $\mu$ f (polarized) to .1 $\mu$ f (non-polarized) with p/n 2111032B13.

**15. Battery Saver:** Due to variations in the VCO and synthesizer circuitry of the portables, a small number of 'A' model radios (low power and high power VHF and UHF HT600's) may exhibit the following symptoms when the Battery Saver Option is enabled:

1. Degradation by 2 to 3 db of squelch opening sensitivity.
2. Increase in PL detect time by about 200ms.
3. Squelch chatter at threshold squelch opening.
4. Intermittent unlock of synthesizer.
5. "Quik-Call II" may not open unless a very strong signal is present.

Be aware that 'B' model radios may exhibit symptoms 1 and 2, and the customer should be made aware of degradation prior to enabling the option.

**16. Shorted Bypass Capacitors:** Several problems noted due to shorting bypass capacitors on the universal connector. See C301-C308. Constant alert tone, constant transmit, and inability to read the radio have all been noted, check continuity. Solution is to replace shorted capacitors.

## 17. DTMF Related Problems:

**Mic Desense:** The symptom is collapse of mic audio. This can normally be attributed to ground loops and can be solved by:

- a. Isolating the metal microphone clip from contact with the speaker basket.
- b. Cutting the ground connection to the pad on the PCB where the speaker/PCB clip makes contact. This has already been done on boards manufactured after 11/1/88.
- c. If all else fails, a 100pf cap directly across the mic terminals always works. Use a chip cap, make sure the soldering iron is not too hot, and watch out for static discharge (ground yourself and soldering iron).

**Tone length:** Some systems require that the DTMF front covers generate tones at a longer tone length than set by the factory. This can be done by replacing R702 with the appropriate resistor.

Part Number	Resistance	Tone Duration Range (ms)	Tone Duration Nominal (ms)
06-60076B10	240K	94-108	101
06-60076B12	300K	117-135	126
06-60076B14	360K	141-162	151
06-60076B16	430k	168-193	180
06-60076B17	470K	184-211	197
06-60076B18	510K	199-229	214
06-60076B19	560K	219-252	235
06-60076B20	620K	242-279	260
06-60076B21	680K	266-306	285
06-60076B22	750K	293-337	315
06-60076B23	820K	320-368	344
06-60076B24	910K	335-409	382
06-60076B25	1M	391-449	420

**Misc. DTMF:** Various problems may occur due to wires being pinched (sometimes cut) under the PCB/speaker clip or kinked under the front cover. Also, it is important that the tone deviation be set in the  $\pm 3.0$  to 3.2 KHz window. Higher dev results in distorted tones. Low dev may cause loss of signal.

## 18. Multi-Unit Charger :

**Blinking Red Light Problem:** Certain high capacity batteries exhibit a temporary higher than normal charging resistance. The constant current charger senses this as a high battery voltage and flashes the red light. Software modifications implemented June 1988, have been incorporated into the "MASK 1 REV A" microcomputer that allows the battery to continue charging at a slightly lower charge rate. As soon as the battery charge resistance returns to normal, the charging current will return to the nominal value.

**19. Interconnects:** Interconnects are now available for the HT600 controller flex and for the flex extender fixture. The part numbers are as follows:

<u>Reference Symbol</u>	<u>Motorola Part #</u>	<u>Description</u>
J1	0905573P02	Connector, Flex Top; 13 Pin
J2	0905573P02	Connector, Flex Top; 13 Pin
J3	0905577P01	Connector, Synthesizer; 7 Pin
J4	0905577P01	Connector, Synthesizer; 7 Pin
J5	0905249Q01	Connector, 6 pin
J6	0105959M27	Assembly, Connector IF
P1	2805572P01	Connector, Flex Top; 13 Pin
P2	2805572P01	Connector, Flex Top; 13 Pin
P3	2805144Q01	Connector, Synthesizer; 7 Pin
P4	2805144Q01	Connector, Synthesizer; 7 Pin
P5	2805250Q01	Connector, Front Cover
P6	2805247Q01	Connector, IF

**20. Audio Feed Through with Surveillance Accessories:** When using an 'A' issue controller flex, isolation between the remote speaker and the internal speaker is 40dB which results in audio feed through the radio front cover. When using the surveillance accessory (ZMN6032A) it is therefore recommended that the 'B' issue controller flex be used which offers audio isolation of up to 70dB.

**21. Repair of UHF VCO and Buffer Modules:** When repair of either the VCO or buffer module is needed, it is recommended that the VCO, buffer and buffer shield be ordered. (It is necessary to remove the synthesizer before replacing the VCO and buffer). The VCO and buffer should be replaced simultaneously due to the difficulty in unsoldering the buffer shield from the VCO without damaging the modules.

**22. Intermittent Radio Operation:** Intermittent type operation has been noted on radios due to the on/off switch, S1. To check for this problem, remove the radio from the housing and take the front shield off. Compare the voltage on the PTT/B+ flex (battery side) to the voltage on the switch S1 (radio side). If there is a difference of 0.5 volts or greater, change the volume pot.

**23. Audio Accessories:** The following is a list of accessories that are compatible with the the HT600 portable:

**HT600 Radio Using Earphone Jack Adaptor - NTN4812A**

- Earpiece with volume control - NTN5043A
- 2.5mm to 3.5mm Adaptor - 5880378B84

**HT600 Radio Using Antenna/RF Adaptor - NTN5368A**

- Cable adaptor antenna/RF adaptor - NKN6408A

**HT600 Radio Using Hirose Adaptor - NTN5075A**

- 2 Wire Surveillance Accessory - ZMN6032A
- Remote Speaker Microphone (EXPO) - NMN6100A
- Earpiece without Volume Control - NSN6050A
- Extra Loud Lapel Speaker - NSN6051A
- Headset Adaptor Cable (EXPO) - NTN4397A
- Headset w/ boom microphone - NMN6064A
- Headset w/ muff microphone - NMN6065A



Also, **knurled thumb screws** are available for the accessories listed below:

<u>Thumbscrew</u>	<u>Accessory Used On</u>
0305202T01	NMN6127C - Old Remote Microphone
0305202T02	NTN5050A - Public Safety Microphone NMN6145A - Remote Microphone w/jack
0305202T03	NMN6156A - New Remote Microphone NMN6155A - New Remote Microphone w/velcro (To be released November 1988)

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# bulletin

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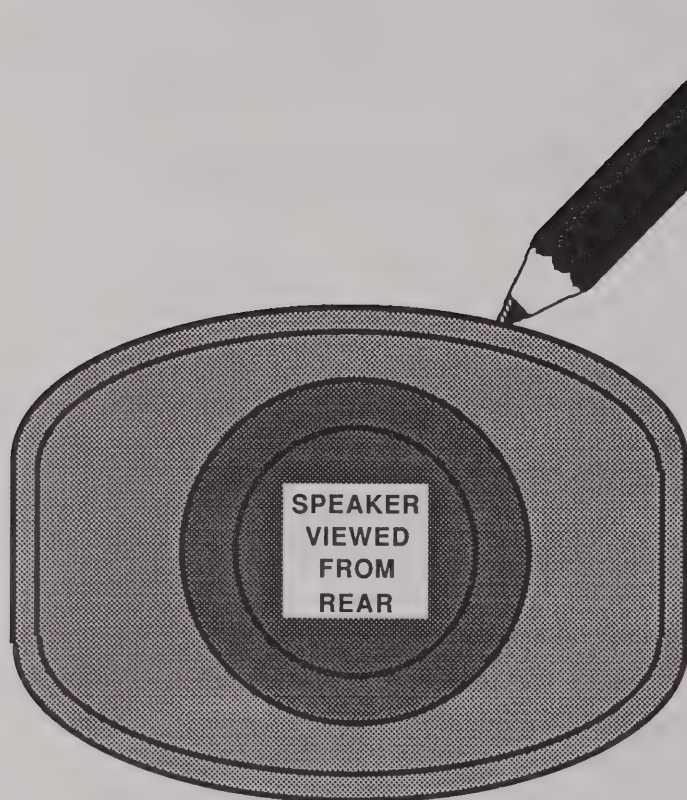
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**PORTABLE PRODUCTS****SRN-1061****APC-719****AUGUST, 1988****MENU SPEAKER MOUNTING INSTRUCTIONS****GENERAL INFORMATION**

1. The opening for the menu speaker must be within approximately 1/4 inch as large as the outer rim of the speaker horn. **DO NOT** mount the speaker behind an opening significantly smaller than the speaker horn. This will result in degraded inbound customer audio. The preferred method, described in the attached illustrations, is to place the front rim of the speaker against the menu sign and trace the outer edge with a pencil. Cut the opening for the speaker 1/4 inch smaller than the outline. Install the speaker from the front of the sign. A 6x9 inch speaker grille may be used to hold the speaker in place or you may use the brackets supplied for this purpose.
2. If the speaker cannot be mounted as described above, at least be sure that the opening is approximately the same size as the outer rim of the speaker horn. Mount the speaker as close as possible to the front grille. **DO NOT** leave a space between the speaker and the speaker grille.
3. Mount the speaker at eye level for the average customer. Mounting the speaker at a lower level will result in increased engine noise pickup.
4. In most cases it will be necessary to acoustically dampen the inside surfaces of the menu sign or post to reduce the inbound background noise level. Acoustic materials are commercially available for this purpose or a material such as household fiberglass insulation may be applied using contact cement.

## MENU SPEAKER MOUNTING INSTRUCTIONS



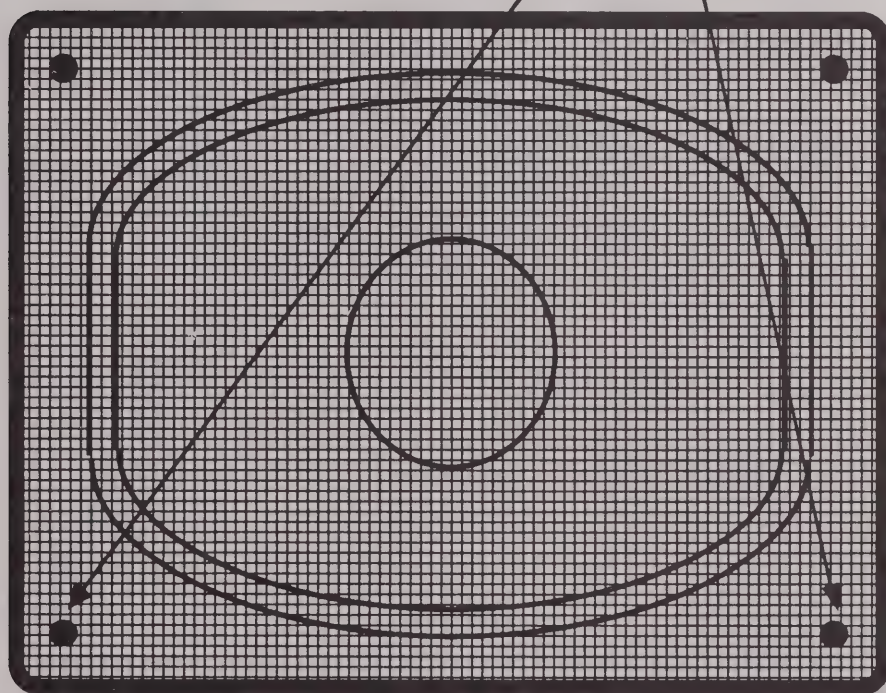
PRESS THE FRONT OF  
THE SPEAKER AGAINST  
THE FACE OF THE  
MENU SIGN AND TRACE  
THE OUTER EDGE OF THE  
SPEAKER WITH A  
PENCIL



CUT THE OPENING  
1/4 INCH SMALLER  
THAN THE OUTLINE

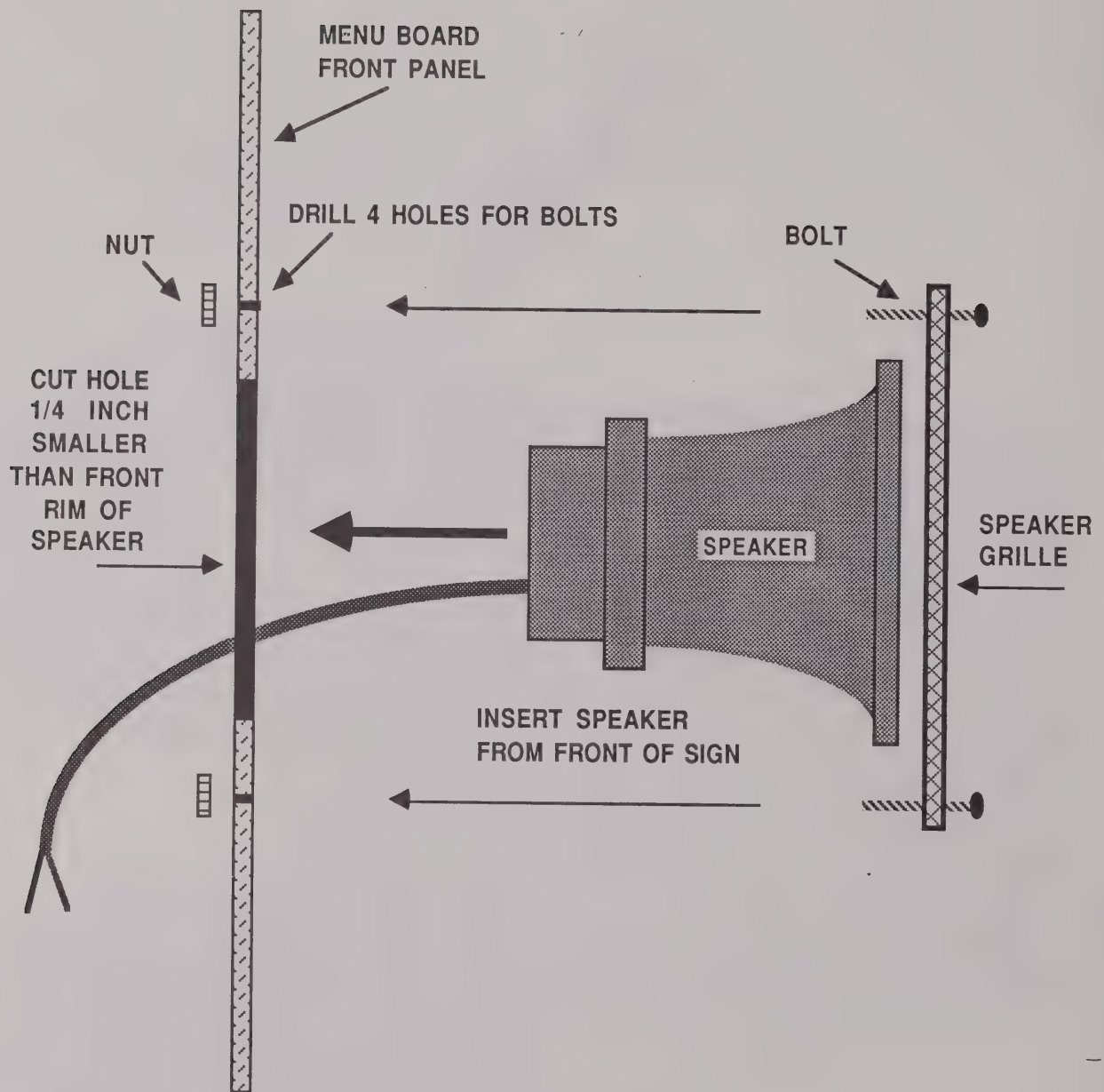
## MENU SPEAKER MOUNTING INSTRUCTIONS

CENTER THE 6"X 9" SPEAKER  
GRILLE OVER THE SPEAKER  
AND DRILL 4 MOUNTING  
HOLES IN THE SIGN FRONT  
PANEL

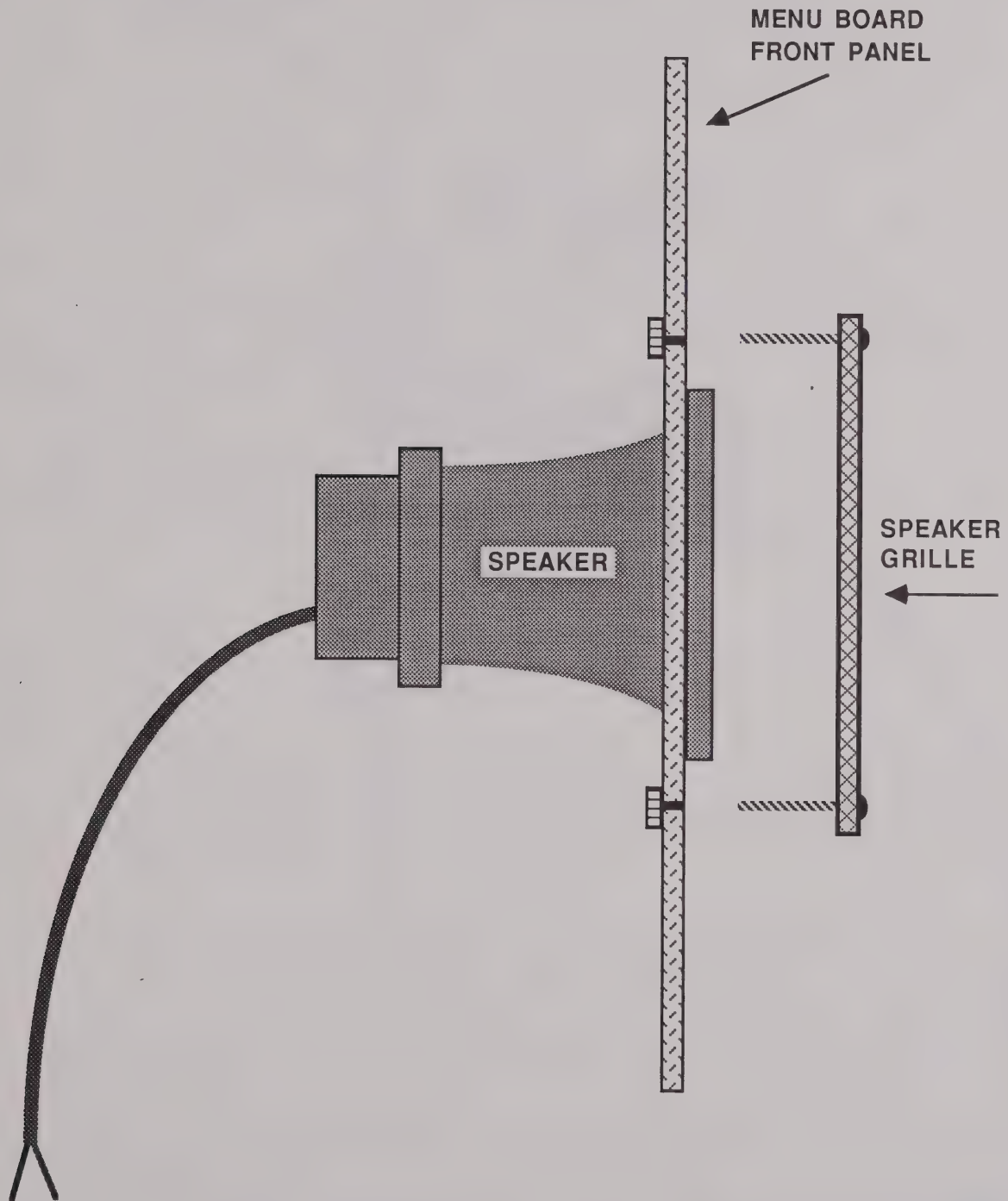




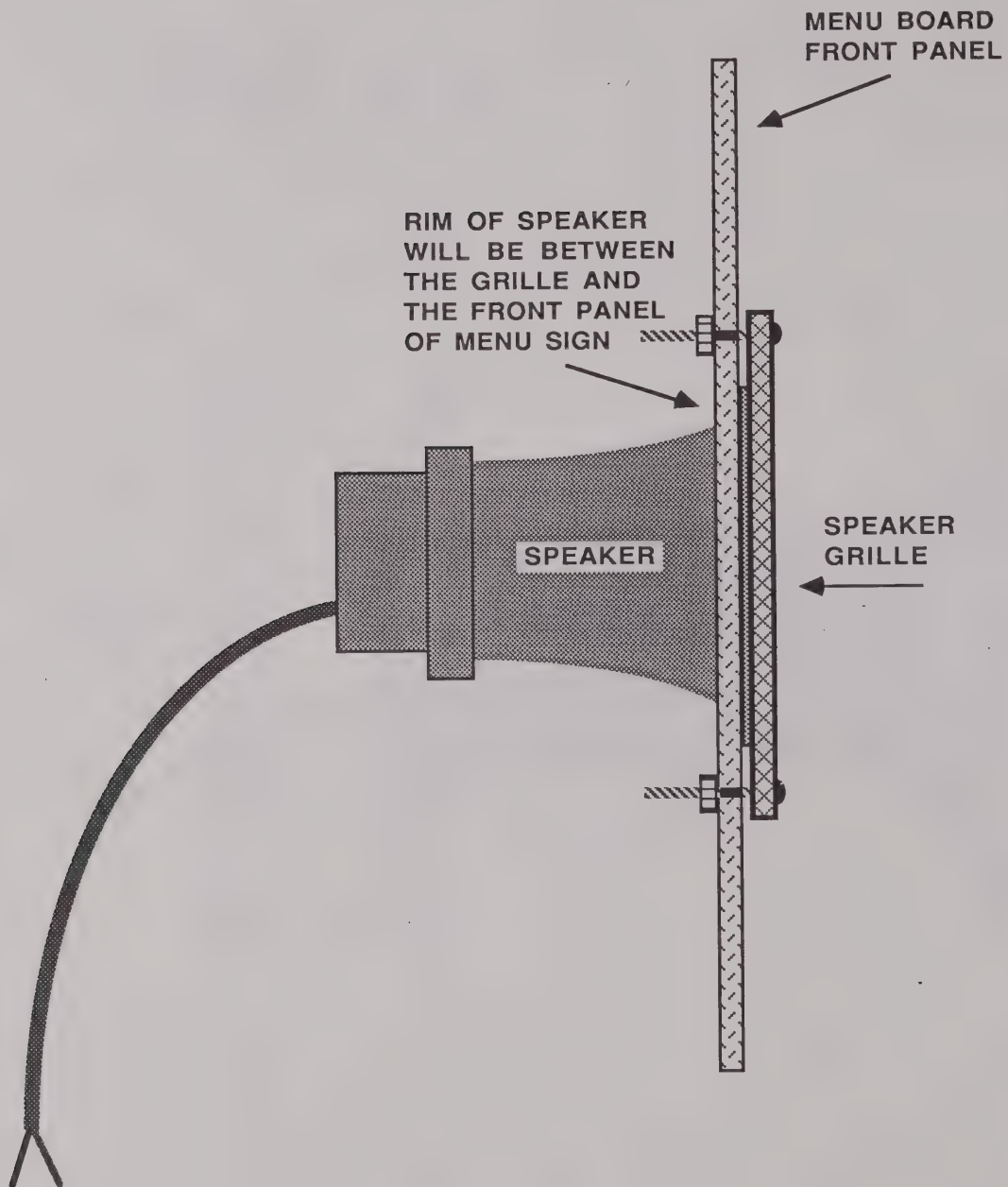
## MENU SPEAKER MOUNTING INSTRUCTIONS



## MENU SPEAKER MOUNTING INSTRUCTIONS



## MENU SPEAKER MOUNTING INSTRUCTIONS



# bulletin

TECHNICAL INFORMATION CENTER • 8000 W. SUNRISE BLVD. • FT. LAUDERDALE, FL 33322 • (305) 475-6170

## PORTABLE PRODUCTS

SRN-1062

APC 620

October 20, 1988

SUBMERSIBILITY TEST PROCEDURES FOR THE  
MX300-R SERIES PORTABLE

The attached instruction manual 68P81106C34-A depicts detailed instructions for testing the MX300-R series portable for submersibility. Also included is a list of the necessary test equipment, and troubleshooting instructions, should the portable fail the test.

The MX300-R radio utilizes a new Adapter and Seal Assembly kit, Motorola kit number NLN5611A. When the adapter and seal assembly are used in conjunction with the pressure and vacuum pumps the radio's integrity for air leaks and submersibility can be tested.

IMPORTANT

The fuse seal can become loose which can cause water leakage upon submersion and it is, therefore, important to insure that the fuse seal is in position at all times.

A new seal plug is available, Motorola part number 2805480T01, and is identified on the exploded parts list. The attachment of the seal plug to the fuse seal requires no adhesive. The seal plug's small end is located over the elongated opening on the fuse seal and is pressed firmly in position.

If your radio is not equipped with a seal plug, Motorola part number 2805480T01, you can obtain this part from the C. & E. National Parts Department. (See the exploded view for reference.)

It is recommended that the testing procedures be done when ever a MX300-R radio is opened for servicing or when the periodic maintenance (PM) check is performed on the portable.

Read through the instructions to familiarize yourself with them before proceeding with the test.

The test equipment referenced to in the instructions is available through the C. & E. National Parts Dept.

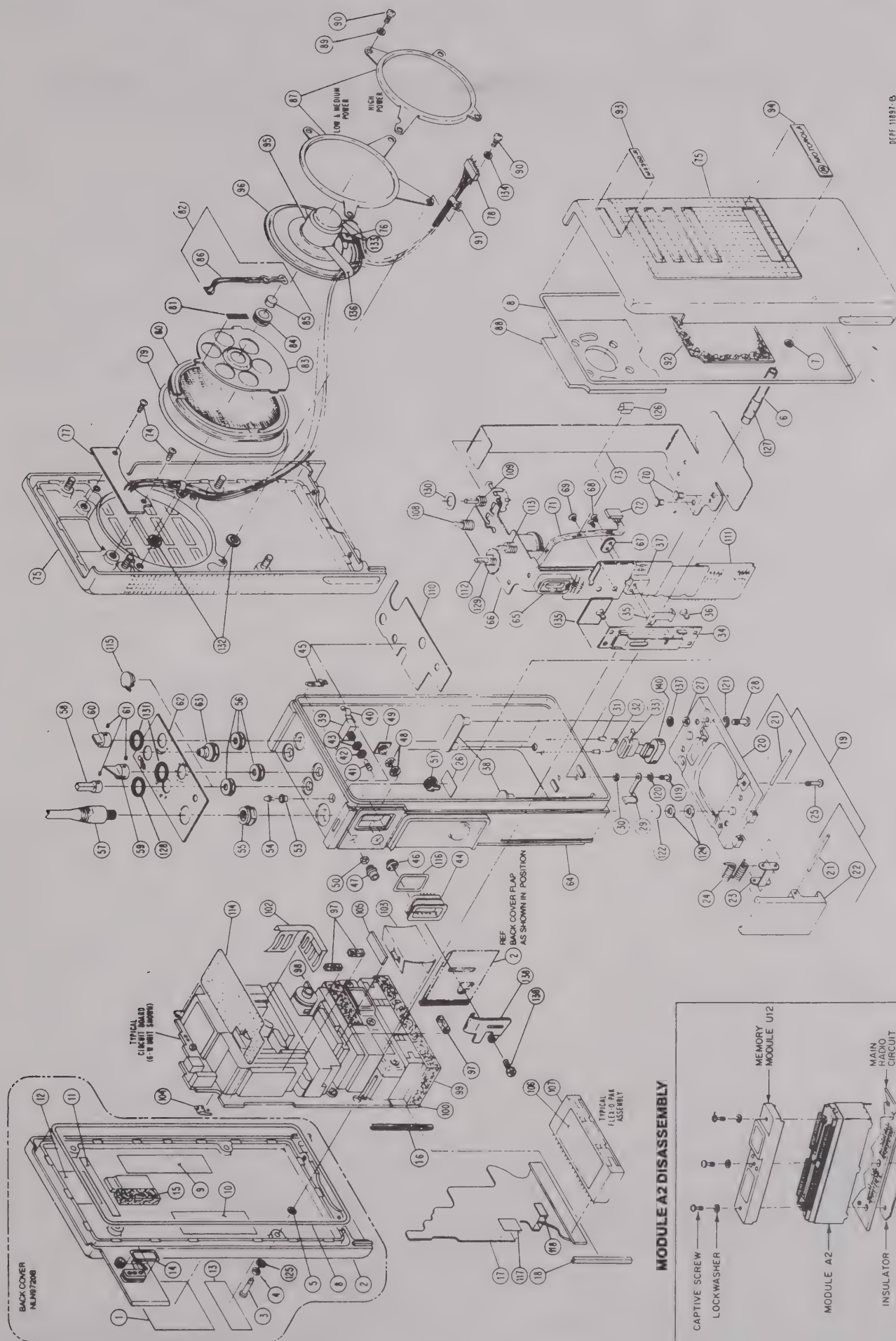
Page 1 of 4

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.



The seal plug, part number 2805480T01, is available through C. & E. National Parts free of charge by referencing this SRN number. The serial number of the portable must accompany the request. No warranty is being offered for labor.



DIFF 11857-6

# MODULE A2 DISASSEMBLY AND EXPLODED VIEW

1-4

# Exploded View Parts List

ITEM NO.	MOTOROLA PART NO.	DESCRIPTION
1	NLN7475A	NAMEPLATE, TOP (Domestic)
2	or NLN7477A NLN9720B 1505683M02	NAMEPLATE, TOP (International) BACK COVER KIT, includes: a. COVER, Back (item 2) b. items 3, 4, 5, 8, 11, 12, 14, 15 & 125
3	0382210E15	SCREW, Captive
4	3205472P04	GASKET, O-Ring
5	0405818D01	WASHER, Flat
6	4305569M01	STANDOFF
7	040009743	LOCKWASHER, #4 Split
8	3205473P02	GASKET, Rectangular
9	NLN7355A	LABEL, Zone C/D
10	NLN7556A	LABEL, Zone A/B
11	5405171E01	LABEL, Intrinsically Safe
12	1305436E01	DECAL, Patent No.
13	3305104J05	LABEL, Blank (NLN7094A)
14	3205473P04	GASKET, Rectangular
15	7505295N01	PAD, Shock
16	1110033E12	RAILTAPE
17	NLE9340A	"MODU-FLEX"
18	0705829C04	BRACKET, Rail Mounting
19	0105952J76	BATTERY LATCH ASSEMBLY, Includes: items 20 thru 24
20	-----	PLATE, Base; part of item 19
21	-----	PIN, Roll; part of item 19
22	-----	LATCH, Battery; part of item 19
23	-----	LINK, Latch; part of item 19
24	-----	SPRING, Latch; part of item 19
25	0305731J02	SCREW, Captive; Phillips Hd., 2-56
26	1405209L04	INSULATOR
27	3205472P05	GASKET, O-Ring
28	0382210E26	SCREW, Captive; 4-40
29	3905903M01	CONTACT, Battery
30	3205472P06	GASKET, O-Ring
31	0905604C07	SOCKET, Spring
32	See Note	FUSE (F401)
33	1505576M02	CASE, Fuse Seal
34	0705658M01	BRACKET, PTT
35	4505238M01	ACTUATOR, PTT
36	0305685F06	SCREW, Flat Phillips Hd., 2-56
37	See Note	SWITCH, PTT (S304)
38	6405575M02	NUT PLATE, Frame
39	See Note	JACK, Antenna (J401)
40	2605767C01	SHIELD
41	0105585H01	ASSEMBLY, Plug and Spring
42	3205295F01	GASKET, O-Ring
43	0405294F01	WASHER
44	See Note	HOUSING, Side Connector (J402)
45	2905629N01	LUG, Ground
46	0205578M01	NUT, Side Connector
47	0205785C01	NUT, Retainer
48	3205472P07	GASKET, O-Ring
49	4305577M01	INSERT, Side Connector
50	1405664J01	INSULATOR, Plunger
51	-----	BUSHING & LUG, ANTENNA; Part of item 64
52	-----	Not Used
53	3205573M01	SEAL, LED
54	See Note	LED (CR303)
55	0205588M01	NUT, Seal
56	0205586M01	NUT, Seal
57	See Note	ANTENNA
58	3605695M03	KNOB, Zone Switch
59	3605695M01	KNOB, Control
60	3605695M02	KNOB, Volume
61	0305480E02	SETSCREW
62	-----	ESCUTCHEON: Carrier Sq., Zone ABCD Carrier Sq., Zone A "PL" Sq., Zone A "PL" Sq., Zone ABCD Carrier Sq., Zone A (Internal Sq.) "PL" Sq., Zone A (Internal Sq.)
63	0205587M01	NUT, Seal
64	0105952J74	ASSEMBLY, Frame; includes item 51
65	See Note	SOCKET, Side Connector (J302)
66	NTN4261A	CONTROL FLEX
67	6405444M02	PLATE, Bearing
68	0305731J04	SCREW, Plate
69	4205506C02	STRAIN RELIEF
70	-----	STUD; part of item 73
71	See Note	ASSEMBLY, Cable (J303); includes item 72
72	-----	JACK; part of item 71

73	0105952J75	ASSEMBLY, Power Flex; includes item 70
74	0300140332	SCREW, Phillips Hd.; 3-28 X 3/16"
75	1505684M01	COVER, Front; Silverized
76	1482392E07	INSULATOR, Tape
77	0105952J77	ASSEMBLY, Microphone/Filter Circuit Board; includes Circuit Board (item 77) and item 78
78	-----	PLUG (P403); part of item 77
79	3205472P08	GASKET, O-Ring
80	0105959J79	ASSEMBLY, Membrane; includes item 79
81	1105153E03	TAPE
82	See Note	ASSEMBLY, Microphone (MK401); includes items 83 thru 86
83	-----	BRACKET, Microphone; part of item 82
84	-----	GROMMET, part of item 82
85	-----	MICROPHONE, part of item 82
86	-----	FLEX CIRCUIT, part of item 82
87	0705423C01	BRACKET, Speaker; low and medium power radios
88	or 0705875C01 7505290N01	BRACKET, Speaker; high power radios
89	or 7505290N02 0400400139	PAD, Contour; low and medium power radios
90	0300138661	PAD, Contour; high power radios
91	4205624L01	LOCKWASHER, #2 split
92	7505291N02	SCREW, Phillips Hd.; 2-56 X 5/32"
93	3305676M01	STRAP, Wire
94	3305675M01	PAD, Pressure
95	7505191E01	LABEL, Product
96	See Note	LABEL, Motorola
97	7505295N02	BOOT, Speaker
98	4205741H01	SPEAKER (LS401)
99	7505118E02	PAD, Shock
100	6405908N03	CLIP, Ground
101	-----	PAD, Shock (2 pads required in some applications)
102	4205360E01	PLATE, Filler; 2-unit length (high power radios)
103	4205896J01	PLATE, Filler; 4-unit length (low and medium power radios)
104	3905188D03	Not Used
105	7505241K01	CLIP, PLL
106	1405582L01	CLIP, Shock
107	NLE9020A	CONTACT, Grounding
108	See Note	PAD, Shock; PL radios only
109	See Note	INSULATOR
110	1405664E01	"FLEX-O-PAK" module
111	NTN4257A	SWITCH (S303)
112	or NTN4331A	POTENTIOMETER (R308)
113	or NTN4332A	INSULATOR
114	or NTN4260A	FLEX, Frequency
115	See Note	No Zone
116	See Note	2-Zone
117	3205473P03	3-Zone
118	1484309H05	4-Zone
119	1484309H05	SWITCH (S501)
120	0305731J03	SWITCH (S502)
121	040002627	INSULATOR
122	0400114582	PLUG, Seal; used in radios when items 108 and/or 112 are not used
123	3205514Q01	GASKET, O-Ring; part of item 44
124	3205082E25	INSULATOR (High power radios only)
125	0405465C01	INSULATOR
126	4205859H01	SCREW, Phillips; 2-56
127	3700132026	LOCKWASHER, Internal Tooth
128	0405110K19	LOCKWASHER, Internal Tooth
129	0405342C03	GORTOX SEAL, port
130	0400124629	Not Used
131	0405110K20	GASKET, O-Ring
132	0400490516	WASHER, Teflon
133	3700132256	CLIP HARNESS (low and medium power)
134	0400120581	TUBING, Shrink
135	1482392E03	SPACER, Squelch POT, Zone switch
136	1482392E02	WASHER, Double-D, (Zone radios)
137	0405216L15	SPACER
138	4205241R04	SPACER, Volume POT, Freq. Switch
139	0305731J13	WASHER, Flat
140	2805480T01	SLEEVEING
		WASHER, Flat
		INSULATOR, Tape
		INSULATOR, Tape
		WASHER, Flat
		RETAINER, Side Seal
		SCREW, Captive; 6-32
		PLUG, Sealing

NOTE: Refer to Electrical Parts List for part number and description.

## EXPLODED VIEW PARTS LIST





## SPECIAL TESTING AND TEST PROCEDURES

### 1. INTRODUCTION

MX300-R portable radios meet the stringent requirements of U. S. MIL-STD-810C, Method 512.1, Procedure I, and Method 506.1, Procedures I and II which require the MX300-R radios to maintain watertight integrity when immersed in three feet of water for two hours. The protective side connector flap and flap retainer plate must be securely fastened. The fuse cover must be in place and tightly secured to ensure against leakage. This is accomplished when the radio and battery are engaged and locked in position.

Radios shipped from the Motorola factory have passed the water immersion test and should not be disassembled. If disassembly is necessary, refer to qualified service personnel and service shops capable of restoring the watertight integrity of the radio.

#### CAUTION

It is strongly recommended that maintenance of the MX300-R radio be deferred to qualified service personnel and service shops. This is of paramount importance as irreparable damage to the radio can result from service by unauthorized persons. If disassembly is necessary, unauthorized attempts to repair the radio may void any existing warranties or extended performance agreements with Motorola. It is also recommended that submersibility be checked annually by qualified service personnel.

If the radio is accidentally dropped in water, shake the radio to remove the excess water from the speaker grille area before operating; otherwise, the sound may be distorted until the water has evaporated from this area. Also, remove the water and dry the side connector contacts if the side connector flap was not properly in place.

### 2. GENERAL INFORMATION

To ensure that the submersible radio is truly a watertight unit, special testing, test procedures, and specialized test equipment are required. The special testing involves a vacuum check of the radio and pressure testing (troubleshooting) for water leaks if the vacuum check fails. The specialized test

equipment is needed to perform the vacuum check and pressure testing, if required.

### 3. SPECIALIZED TEST EQUIPMENT

#### a. Vacuum Pump Kit, NLN9839A

The vacuum pump kit includes a vacuum pump, a gauge, and a vacuum hose. An adapter is required to connect the hose to the baseplate.

#### b. Pressure Pump Kit, NTN4265A

The pressure pump kit includes a pressure pump, a gauge, and a pressure hose. An adapter is required to connect the hose to the baseplate.

#### c. Adapter and Seal Assembly Kit, NTN5611A

The adapter and seal assembly kit connects to the vacuum hose of the vacuum pump kit (NLN9839A) and/or the pressure hose of the pressure pump kit (NTN4265A). The adapter and seal assembly includes a special radio baseplate clamp adapter, an air vent plug, and a hose adapter.

#### d. Miscellaneous Hardware

Other items needed for testing the submersible radio include:

- Silicone grease (Motorola part no. 1110027B08).
- Large water container, preferably a two-gallon glass fishbowl type.
- Fresh distilled water.
- A supply of replacement seals (including port seal), O-rings, and gaskets (refer to the exploded view parts lists in the applicable service manual for Motorola part numbers).

### 4. DISASSEMBLY AND REASSEMBLY

If disassembly and reassembly of the radio are required, refer to the **DISASSEMBLY PROCEDURE** in the applicable service manual. Adhere to the torque specifications and assembly notes outlined there when reassembling the radio.

Ⓜ, Motorola, MX300-R, and Handie-Talkie are trademarks of Motorola Inc.



**DO NOT REASSEMBLE THE RADIO WITHOUT FIRST PERFORMING THE FOLLOWING PRELIMINARY ASSEMBLY PROCEDURE:**

*Refer to the exploded view diagram and exploded view parts list in the service manual.*

- a. Remove the rectangular O-rings (item 8) from the front (item 75) and back (item 2) covers.
- b. Inspect the seal areas around the front cover, back cover, and frame for foreign material that might prevent the main seal rectangular O-rings (8) from sealing properly.
- c. Inspect the rectangular O-rings (8). If they are split, cracked, or damaged in any way, discard and replace them.
- d. Lubricate and install the rectangular O-rings (8).
- e. Check to ensure that the four O-ring gaskets (item 4) are in place on the four back cover screws (item 3), and are not damaged in any way. It is recommended that all four O-rings be replaced each time the radio is disassembled.
- f. Reassemble the radio.

**NOTE**

If the base plate must be disassembled, or if any of the switches, the LED, the side connector housing, or the battery contacts must be removed, refer to the **PRESSURE TEST** procedure (section 6) for resealing the radio.

**CAUTION**

Before securing any of the removed parts, refer to the **TORQUE SPECIFICATIONS** table (in the **DISASSEMBLY PROCEDURE** of the applicable service manual) for correct torque values for resealing the radio.

## 5. VACUUM TEST

*Refer to the exploded view diagram and parts list in the applicable service manual.*

### a. General

The vacuum test uses a vacuum pump and gauge. The pump creates a vacuum condition inside the radio, and the gauge monitors the radio for a stable vacuum reading; that is, checking for a properly sealed, watertight unit. Before starting the vacuum test:

- Remove the battery and check the two battery contact mounting screws (119) for 4.0 in. lbs. of torque.
- Check the four baseplate mounting screws (28) and the four back cover captive screws (3) for 4.0 in. lbs. of torque.
- Check to ensure that the side connector flap seal is secured with the flap retainer plate, and the retainer screw is in place and torqued to 4.0 in. lbs.
- Check to ensure that the fuse cover (item 33) is in place and properly seated, and the battery compresses the seal when the radio and battery are engaged. If the seal is defective (that is, shows signs of wear, tears, or nicks), install a new fuse cover.

### b. Conducting the Test

- (1) Before performing any testing procedures, the vent hole must first be inspected for foreign matter and/or water that has become trapped inside the seal port.
  - If any foreign matter has become trapped inside the seal port, the baseplate must be removed.
    1. If the baseplate is removed, the port seal (122) and the two O-rings (124) must be replaced.
    2. Inspect the seal port on the frame (64) for any damage. If damage has occurred, replace the frame (64). When replacing the port seal, position it so that the smooth side of the seal is facing away from the frame, and the textured side of the seal is facing toward the frame.
    3. Reassemble the baseplate by following the instructions in section 6, paragraph c (8) of this manual, then proceed with the test.
- If water is present in the seal port:
  1. Twist a small piece of absorbent paper (paper towel or similar material) into a slender roll.
  2. Insert the paper roll into the seal port hole and down into the cavity to soak up the water, taking care not to puncture the port seal.
  3. Repeat steps 1 and 2 until the seal port is clear of water, then proceed with the test.

- b. Ensure that the flap seal retainer screw (139) is torqued to the correct value.

2. If the leak continues:

- a. Remove the flap seal retainer (138), and inspect the seal area around the flap and side connector for any damage to their surfaces.

- If the side connector housing is damaged, replace the housing (44).
- If the flap sealing surface is damaged, replace the back cover (2).
- If the rectangular O-ring (14) is damaged, discard it, and install a new O-ring.
- In any case, lubricate the rectangular O-ring before installing it, making certain that the O-ring is properly seated.

- (b) If the bubbles come from around the outside of the side connector housing, remove the housing and inspect the surface of the frame (64) that mates with the O-ring (116).

- If the frame surface is damaged in any way, replace the frame.
- Otherwise, replace the side connector housing (44), and lubricate and install a new O-ring (116); make sure that the O-ring is properly seated.

#### (5) Side Connector Nut Seal

If a leak occurs in this area, torque down the side connector nut (46) to the correct specifications and re-test for a leak. If the leak persists:

- (a) Disassemble the radio, and remove the side connector nut (46) and side connector insert (49). To remove the side connector insert, the printed circuit board, frequency flex (111), and control flex (66) must first be removed.

- (b) Inspect the surfaces of the hole in the frame (64) and the connector insert (49) that mate with the O-rings (48).

- If the sealing surface of the insert is damaged in any way, replace the insert (49).
- If the sealing surface of the frame hole is damaged in any way, replace the frame (64).
- In any case, lubricate and install new O-rings (48).

#### (6) Antenna RF Jack

If this area is the source of a leak, press the flap seal tightly against the frame and pressurize the radio to 3 psig.

- (a) If the leak stops, no more troubleshooting is required.

#### NOTE

The flap must be pressed tightly against the frame to avoid any leak from within the antenna rf jack.

Inspect the flap seal retainer (138) to ensure that the retainer screw (139) is correctly torqued.

- (b) If the leak continues:

Check the round seal on the flap and the mating surface on the frame. Replace the faulty item: the frame (64) or the back cover (2).

#### (7) Battery Contact Seals

If a leak occurs in this area, torque down the battery contact screws (92). If the leak persists:

- (a) Remove the battery contacts and inspect the surfaces of the holes in the frame that mate with the battery contact O-rings (30). If the seal area is damaged in any way, replace the frame (64).

- (b) In any case, lubricate and install new O-rings (30).

#### (8) Baseplate Screw Seals

If a leak occurs in this area, torque down the baseplate screws (28). If the leak persists:

- (a) Remove the baseplate assembly (19) from the radio frame by loosening the four captive screws (28).

- (b) Inspect the fuse seal (33) and fuse seal plug (140) for damage or wear. Replace the fuse seal and fuse seal plug if necessary.

- (b) Inspect the sealing surfaces of the holes that mate with the O-rings (27). If the seal areas are damaged in any way, replace the frame (64).

**DO NOT REASSEMBLE THE RADIO WITHOUT FIRST PERFORMING THE FOLLOWING PRELIMINARY ASSEMBLY PROCEDURE:**

*Refer to the exploded view diagram and exploded view parts list in the service manual.*

- a. Remove the rectangular O-rings (item 8) from the front (item 75) and back (item 2) covers.
- b. Inspect the seal areas around the front cover, back cover, and frame for foreign material that might prevent the main seal rectangular O-rings (8) from sealing properly.
- c. Inspect the rectangular O-rings (8). If they are split, cracked, or damaged in any way, discard and replace them.
- d. Lubricate and install the rectangular O-rings (8).
- e. Check to ensure that the four O-ring gaskets (item 4) are in place on the four back cover screws (item 3), and are not damaged in any way. It is recommended that all four O-rings be replaced each time the radio is disassembled.
- f. Reassemble the radio.

**NOTE**

If the base plate must be disassembled, or if any of the switches, the LED, the side connector housing, or the battery contacts must be removed, refer to the **PRESSURE TEST** procedure (section 6) for resealing the radio.

**CAUTION**

Before securing any of the removed parts, refer to the **TORQUE SPECIFICATIONS** table (in the **DISASSEMBLY PROCEDURE** of the applicable service manual) for correct torque values for resealing the radio.

## 5. VACUUM TEST

*Refer to the exploded view diagram and parts list in the applicable service manual.*

### a. General

The vacuum test uses a vacuum pump and gauge. The pump creates a vacuum condition inside the radio, and the gauge monitors the radio for a stable vacuum reading; that is, checking for a properly sealed, watertight unit. Before starting the vacuum test:

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- Check to ensure that the side connector flap seal is secured with the flap retainer plate, and the retainer screw is in place and torqued to 4.0 in. lbs.
- Check to ensure that the fuse cover (item 33) is in place and properly seated, and the battery compresses the seal when the radio and battery are engaged. If the seal is defective (that is, shows signs of wear, tears, or nicks), install a new fuse cover.

### b. Conducting the Test

- (1) Before performing any testing procedures, the vent hole must first be inspected for foreign matter and/or water that has become trapped inside the seal port.
- If any foreign matter has become trapped inside the seal port, the baseplate must be removed.
  1. If the baseplate is removed, the port seal (122) and the two O-rings (124) must be replaced.
  2. Inspect the seal port on the frame (64) for any damage. If damage has occurred, replace the frame (64). When replacing the port seal, position it so that the smooth side of the seal is facing away from the frame, and the textured side of the seal is facing toward the frame.
  3. Reassemble the baseplate by following the instructions in section 6, paragraph c (8) of this manual, then proceed with the test.
- If water is present in the seal port:
  1. Twist a small piece of absorbent paper (paper towel or similar material) into a slender roll.
  2. Insert the paper roll into the seal port hole and down into the cavity to soak up the water, taking care not to puncture the port seal.
  3. Repeat steps 1 and 2 until the seal port is clear of water, then proceed with the test.



**DO NOT REASSEMBLE THE RADIO WITHOUT FIRST PERFORMING THE FOLLOWING PRELIMINARY ASSEMBLY PROCEDURE:**

*Refer to the exploded view diagram and exploded view parts list in the service manual.*

- Remove the rectangular O-rings (item 8) from the front (item 75) and back (item 2) covers.
- Inspect the seal areas around the front cover, back cover, and frame for foreign material that might prevent the main seal rectangular O-rings (8) from sealing properly.
- Inspect the rectangular O-rings (8). If they are split, cracked, or damaged in any way, discard and replace them.
- Lubricate and install the rectangular O-rings (8).
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- Reassemble the radio.

**NOTE**

If the base plate must be disassembled, or if any of the switches, the LED, the side connector housing, or the battery contacts must be removed, refer to the **PRESSURE TEST** procedure (section 6) for resealing the radio.

**CAUTION**

Before securing any of the removed parts, refer to the **TORQUE SPECIFICATIONS** table (in the **DISASSEMBLY PROCEDURE** of the applicable service manual) for correct torque values for resealing the radio.

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**b. Conducting the Test**

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- If any foreign matter has become trapped inside the seal port, the baseplate must be removed.

- If the baseplate is removed, the port seal (122) and the two O-rings (124) must be replaced.
- Inspect the seal port on the frame (64) for any damage. If damage has occurred, replace the frame (64). When replacing the port seal, position it so that the smooth side of the seal is facing away from the frame, and the textured side of the seal is facing toward the frame.
- Reassemble the baseplate by following the instructions in section 6, paragraph c (8) of this manual, then proceed with the test.

- If water is present in the seal port:

- Twist a small piece of absorbent paper (paper towel or similar material) into a slender roll.
- Insert the paper roll into the seal port hole and down into the cavity to soak up the water, taking care not to puncture the port seal.
- Repeat steps 1 and 2 until the seal port is clear of water, then proceed with the test.

**CAUTION**

Under no circumstances should a high-pressure air hose be used to "blow out" the water from this area; this could damage or block the seal port membrane.

- Attach the vacuum hose to the vacuum pump. Check the pump and hose for leaks by blocking off the open end of the hose and operating the pump a few times. The actual reading on the gauge at this point is not important; it is important that the gauge pointer remains steady, indicating no vacuum leaks in the pump.

- Ensure that the adapter and seal assembly is attached to the vacuum gauge hose.

- Position the adapter and seal assembly on the radio's baseplate; secure the assembly by snapping down the side latches.

- Operate the pump a few times until the gauge indicates 5 in. Hg. The gauge should indicate a leaking-down and should stabilize at some lower value. The leak-down is normal and important; it indicates that the pressure is equalizing across the port seal (122).

**NOTE**

If this leak-down phenomenon does not occur, the port seal (122) is probably missing, damaged, blocked by foreign matter, or wet. Refer to paragraph b (1) of this section (Vacuum Test).

Operate the pump again until the gauge indicates 5 in. Hg. Some additional leak-down will occur. After repeating this action two or three more times, the gauge should stabilize at 5 in. Hg.

- Observe the gauge for two minutes.
  - If the needle holds steady, then the radio has passed the vacuum test and is approved for submersibility. No additional testing will be required.
  - If the needle does not hold steady, then the radio has failed the vacuum test and the radio might leak if submersed. Additional troubleshooting of the radio will be required; complete this procedure, then go to the **PRESSURE TEST** section of this manual.

- Remove the vacuum hose and adapter from the radio.

**6. PRESSURE TEST**

*Refer to the exploded view diagram and parts list in the applicable service manual.*

**a. General**

Pressure testing the radio is necessary only if the radio has failed the vacuum test. Do not perform the pressure test until the vacuum test has been completed, and the seal and seal port has been inspected. Pressure testing involves creating a pressure condition inside the radio, submersing the radio in water, and observing the radio for a stream of bubbles (leak). Since all areas of the radio are being checked, observe the entire unit carefully for the possibility of multiple leaks before completing this test.

**b. Conducting the Test**

- Before performing any test procedures, inspect the vent hole as detailed in section 5, paragraph b (1).

- Position the adapter and seal assembly with the rubber seal over the seal port. Secure the assembly to the radio's baseplate by snapping down the side latches.

- Attach one end of the pressure hose to the adapter and seal assembly and the other end to the pressure pump.

- Operate the pump until the gauge reads approximately 3 psig. Some leak-down is normal as the pressure equalizes across the port seal membrane.

**CAUTION**

Any pressure greater than 4 psig may push air around the main seal and damage the grille area.

- Maintain the pressure at 3 psig. and submerge the radio into a water-filled container.

- Watch for any continuous series of bubbles.

**NOTE**

Some air entrapment may cause the accumulation of bubbles, especially in the grille area, but the bubbles should not be continuous.

- Note all of the seal areas that show signs of leakage. Pinpoint the problem(s) to one (or more) of the following areas:

- main housing seals (8)
- speaker membrane seal (80)
- back cover screw seals (4)
- side connector housing (44)
- side connector nut seal (48)
- antenna rf jack (39)
- battery contact seals (30)
- baseplate screw seals (27)
- control nut seals (56, 63)
- antenna bushing seal (55)
- LED seal (53)
- fuse seal (33) and seal plug (140)

- Remove the radio from the water container and dry it thoroughly. Be especially careful to dry the area around the main housing seals (8) to prevent contamination of the internal electronics when the unit is opened. Also, make sure that there is no water around the baseplate adapter port to ensure that the area around the port seal remains dry.

- Remove the adapter and pressure hose added in steps (2) and (3).

**c. Troubleshooting Leak Areas**

Before repairing any leak, read all applicable area repair paragraphs. This will help to eliminate unnecessary disassembly and reassembly of a radio with multiple leaks. Troubleshoot only the faulty seal areas listed in the **PRESSURE TEST** section, and, when multiple leaks exist, in the order listed.

**(1) Main Housing Seals**

If a leak occurs under any portion of the main housing seals (8), re-torque the back cover screws to the correct torque value. If the leak persists, remove the front (75) and back (2) covers from the radio frame (64). Inspect the surfaces of the frame, and front and back covers that mate with the rectangular O-rings (8). If any of these surfaces is damaged in any way, replace the faulty item. Otherwise, ensure that the rectangular O-ring (8) is clean, then lubricate and re-install it.

**(2) Speaker Membrane Seal**

- If the grille area of the front cover (75) is the source of a leak, disassemble the radio

and carefully lift the front cover away from the frame.

- Remove the speaker (96) and the microphone bracket (83) by loosening the four screws (90) that secure the speaker bracket (87).

- Remove the speaker membrane (80) and check the contact area of the front cover that mates with the O-ring (79). If the surface is damaged in any way, replace the front cover. Otherwise, replace the speaker membrane assembly and reassemble the radio.

**(3) Back Cover Screw Seals**

- If a leak occurs around any of the four captive screws (3) of the back cover (2), loosen the four screws and carefully lift the cover away from the frame.

- Remove each screw where a leak occurred and inspect the surface of the hole in the back cover that mates with that screw's O-ring (4). If the seal surface is damaged in any way, replace the back cover. In any case, lubricate and install new O-rings (4) on all four captive screws.

**(4) Side Connector Housing**

If this area is the source of a leak, it must be determined whether the leak is internal to the housing, or external around the housing. remove the flap seal retainer (138) and lift the side connector flap seal. Pressurize the radio to 3 psig.

**NOTE**

If the radio does not have a flap seal retainer (138), one must be added. Also, if the back cover (2) does not have a clearance hole for the flap retainer screw, a new cover must be ordered as well.

- If the bubbles come from within the housing, press the flap tightly against the frame and observe whether the leak continues:

- If the leak stops, no more troubleshooting is required.

**NOTE**

The flap must be pressed tightly against the frame to avoid any leak from within the side connector.

- Inspect the flap seal retainer to ensure that it is not deformed in some manner.



- (c) In any case, install new O-rings (27). Before installing the O-rings, make sure there is a washer (137) positioned between the new O-ring and the nut plate threaded boss. Locate the baseplate assembly (19) over the frame and secure the four screws (28) to the nut plates (38) by screwing the screws through the baseplate into and through the previously positioned O-rings located in the frame.

**NOTE**

*Do not lubricate these O-rings (27) with any type of material.*

**(9) Control Nut Seals**

If any of these seals is the source of a leak, it must be determined whether the leak is from around the seal nut or up through the center where the seal mates with the control shaft.

- (a) Remove the knobs (58, 59, and 60), the antenna (57), and the escutcheon (62).

**NOTE**

*Before replacing any control seal nut, re-torque the seal nuts to 5.0 in.lbs. and test the radio again for leaks by the pressure test.*

1. If the leak is coming through the seal nut from around the control shaft, replace the faulty seal nut (56, 63).
2. If the leak is coming from around the seal nut, remove the seal nut and inspect the mating surface of the frame. If the mating surface is damaged in any way, replace the frame (64).
3. In any case, replace the seal nut (56, 63)

**(10) Antenna Bushing Seal**

For leaks from the antenna bushing seal (55) area, follow the procedure explained under "(9) Control Nut Seals."

**(11) LED Seal**

If a leak occurs in this area:

- (a) Remove the control knobs (58, 59, and 60), the antenna (57), and the escutcheon (62).
- (b) Remove the LED (54) and the LED seal (53).
- (c) Inspect the surface of the hole in the frame that mates with the LED seal. If the area is damaged in any way, replace the frame (64). Otherwise, inspect and replace the LED (54) and the LED seal (53). To replace the LED seal, the printed circuit board, frequency flex (111), and control flex (66) must first be removed.

**(12) Fuse Seal and Seal Plug**

If a leak occurs in this area, press the fuse seal (33) and seal plug (140) into position and re-test the radio. If the leak persists:

- (a) Inspect the fuse seal for wear or damage.
- (b) Check to see that the fuse does not protrude above the plastic frame surface. If the fuse is higher than the plastic frame surface, remove the fuse and cut the fuse leads so that the fuse is flush with, or below, the plastic frame surface. Make sure the fuse is centered in the fuse cavity. Ensure that the fuse makes good electrical contact by turning the radio on.
- (c) Replace the fuse seal (33) and seal plug (140) and re-test the radio.



# bulletin

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**MOTOROLA**

COMMUNICATIONS AND ELECTRONICS, INC.

A SUBSIDIARY OF MOTOROLA, INC.

**PORTABLE PRODUCTS****SRN- 1063****APC-719****AUGUST, 1988****PORTA PAK LEVEL SETTING PROCEDURE****OUTBOUND LEVEL**

Position a helper in a vehicle with engine running in front of the menu sign. Press button #1 on the belt unit and speak to the helper at the menu sign. Adjust R67, outbound level on the base station audio and control board, for a comfortable listening level at the menu sign. It is advisable to have more than one person talk into the headset mic to check for voice level differences.

**INBOUND LEVEL**

Position a helper in a vehicle with engine running in front of the menu sign. Instruct the helper to face the menu sign and speak at a normal level. Adjust the volume control on the belt unit to maximum and then adjust R94, inbound level on the base station audio and control board, to a point where the level in the earpiece is slightly too loud with maximum volume on the belt unit.

**CREW TO CREW LEVEL**

Adjust the customer inbound level before adjusting the crew to crew level. The purpose of this adjustment is to balance the crew to crew level with the customer inbound level. Adjust R21, while listening through a belt unit headset, to a point where the crew to crew level matches the level of the customer.

## ALERT TONE LEVEL

Adjust the customer inbound level before adjusting the alert tone level.  
Adjust R11 for a comfortable alert tone level, loud enough to be heard above the ambient noise level inside the store but not to the point of being irritating to the crew members.

THIS SRN IS FOR INFORMATION ONLY AND NO WARRANTY PARTS NOR LABOR IS OFFERED.

# bulletin

**PORTABLE PRODUCTS**  
**SRN- 1064**  
**DECEMBER, 1988**

## **WARRANTY DATE CODING ON**

### **PORTABLE PRODUCTS RECHARGEABLE BATTERIES**

Rechargeable batteries have had a four digit date code hot stamped on the housing for the purpose of determining warranty expiration.

In the future, batteries will be stamped with a three digit numerical code. The first digit will be the year (0 to 9) and the last two digits will be the week in the year (0 to 52). This date establishes the beginning of the one year warranty period. For example, a battery with date code 840 will be in warranty until the 40th week of 1989 or October 7, 1989.

PAGE 1 OF 1

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

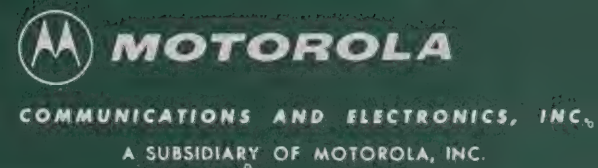
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# bulletin

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## PORTABLE PRODUCTS

SRN- 1065 - A

APC-230,411,422

APRIL 14, 1989

### MT 500 VOLUME CONTROL REPLACEMENT KIT(S)

MT 500 PORTABLES SHIPPED AS OF NOVEMBER 1988 CONTAIN A NEW VOLUME CONTROL DIFFERENT IN DIMENSIONS THAN EXISTING VOLUME CONTROL (O1O5953J54). THIS NEW CONTROL WILL REPLACE ALL PREVIOUS VOLUME CONTROLS IF FAILURE OCCURS.

DEPENDING ON REPLACEMENT NEED, TWO REX KITS HAVE BEEN ESTABLISHED.

REPLACEMENT KIT FOR THE EXISTING RPX-4256A WILL NOW BE REX-4060A AND CONTAIN:

<u>PART NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>
01-05954Q01	1	EA	POTENTIOMETER
02-82653D05	1	EA	NUT
03-83174C02	1	EA	SCRSET FLUTED HD.
04-05157M01	1	EA	WASHER
04-05935F02	1	EA	WASHER
14-05209L04	1	EA	INSULATOR
36-05254K11	1	EA	CONTROL KNOB
43-05881M01	1	EA	SPACER
56-83043H09	1	EA	PACKAGING
68-80309C64	1	EA	INSTRUCTION SHEET
75-83562H02	1	EA	RUBBER PAD

PAGE 1 OF 3

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

THE SECOND IS REX-4061A WHICH REPLACES 01-05953J54 VOLUME POTENTIOMETER. THIS KIT WILL CONTAIN:

<u>PART NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>
01-05954Q01	1	EA	POTENTIOMETER
02-82653D05	1	EA	NUT
14-05209L04	1	EA	INSULATOR
36-05254K11	1	EA	CONTROL KNOB
56-83043H09	1	EA	PACKAGING
68-80309C64	1	EA	INSTRUCTION SHEET

THESE REX KITS ( 4060A AND 4061A ) CAN BE ORDERED FROM C & E PARTS. FIGURE 1 ILLUSTRATES THE KIT PARTS AND ASSEMBLY OF NEW CONTROL.

THIS SRN IS FOR INFORMATION ONLY AND NO WARRANTY PARTS NOR LABOR IS OFFERED.

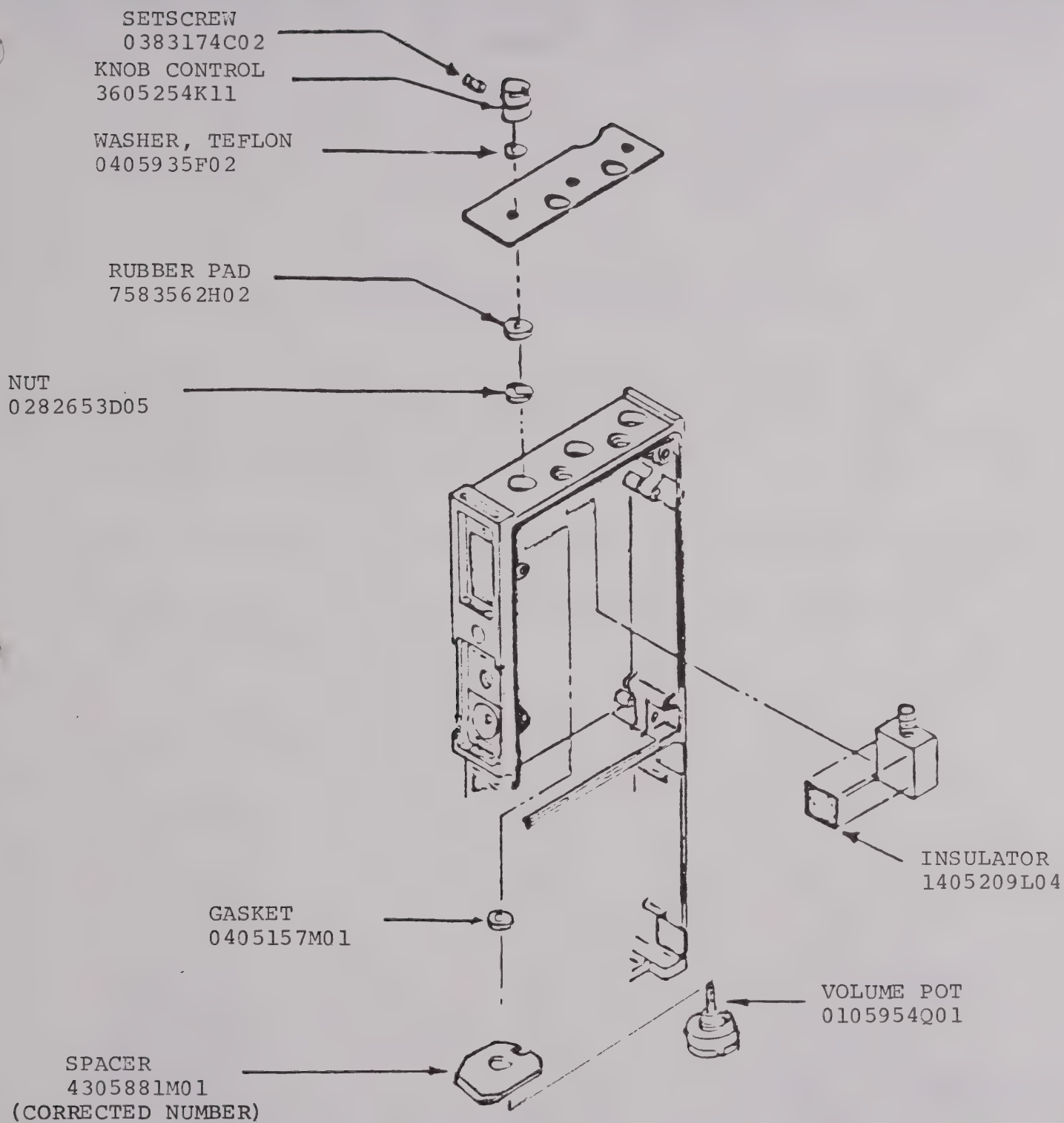


Figure 1





# bulletin


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## PORTABLE PRODUCTS

SRN- 1065 - A

APC-230,411,422

APRIL 14, 1989

## MT 500 VOLUME CONTROL REPLACEMENT KIT(S)

MT 500 PORTABLES SHIPPED AS OF NOVEMBER 1988 CONTAIN A NEW VOLUME CONTROL DIFFERENT IN DIMENSIONS THAN EXISTING VOLUME CONTROL (O1O5953J54). THIS NEW CONTROL WILL REPLACE ALL PREVIOUS VOLUME CONTROLS IF FAILURE OCCURS.

DEPENDING ON REPLACEMENT NEED, TWO REX KITS HAVE BEEN ESTABLISHED.

REPLACEMENT KIT FOR THE EXISTING **RPX-4256A** WILL NOW BE **REX-4060A** AND CONTAIN:

<u>PART NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>
01-05954Q01	1	EA	POTENTIOMETER
02-82653D05	1	EA	NUT
03-83174C02	1	EA	SCRSET FLUTED HD.
04-05157M01	1	EA	WASHER
04-05935F02	1	EA	WASHER
14-05209L04	1	EA	INSULATOR
36-05254K11	1	EA	CONTROL KNOB
43-05881M01	1	EA	SPACER
56-83043H09	1	EA	PACKAGING
68-80309C64	1	EA	INSTRUCTION SHEET
75-83562H02	1	EA	RUBBER PAD

PAGE 1 OF 3

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THE SECOND IS **REX-4061A** WHICH **REPLACES 01-05953J54** VOLUME POTENTIOMETER. THIS KIT WILL CONTAIN:

<u>PART NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>
01-05954Q01	1	EA	POTENTIOMETER
02-82653D05	1	EA	NUT
14-05209L04	1	EA	INSULATOR
36-05254K11	1	EA	CONTROL KNOB
56-83043H09	1	EA	PACKAGING
68-80309C64	1	EA	INSTRUCTION SHEET

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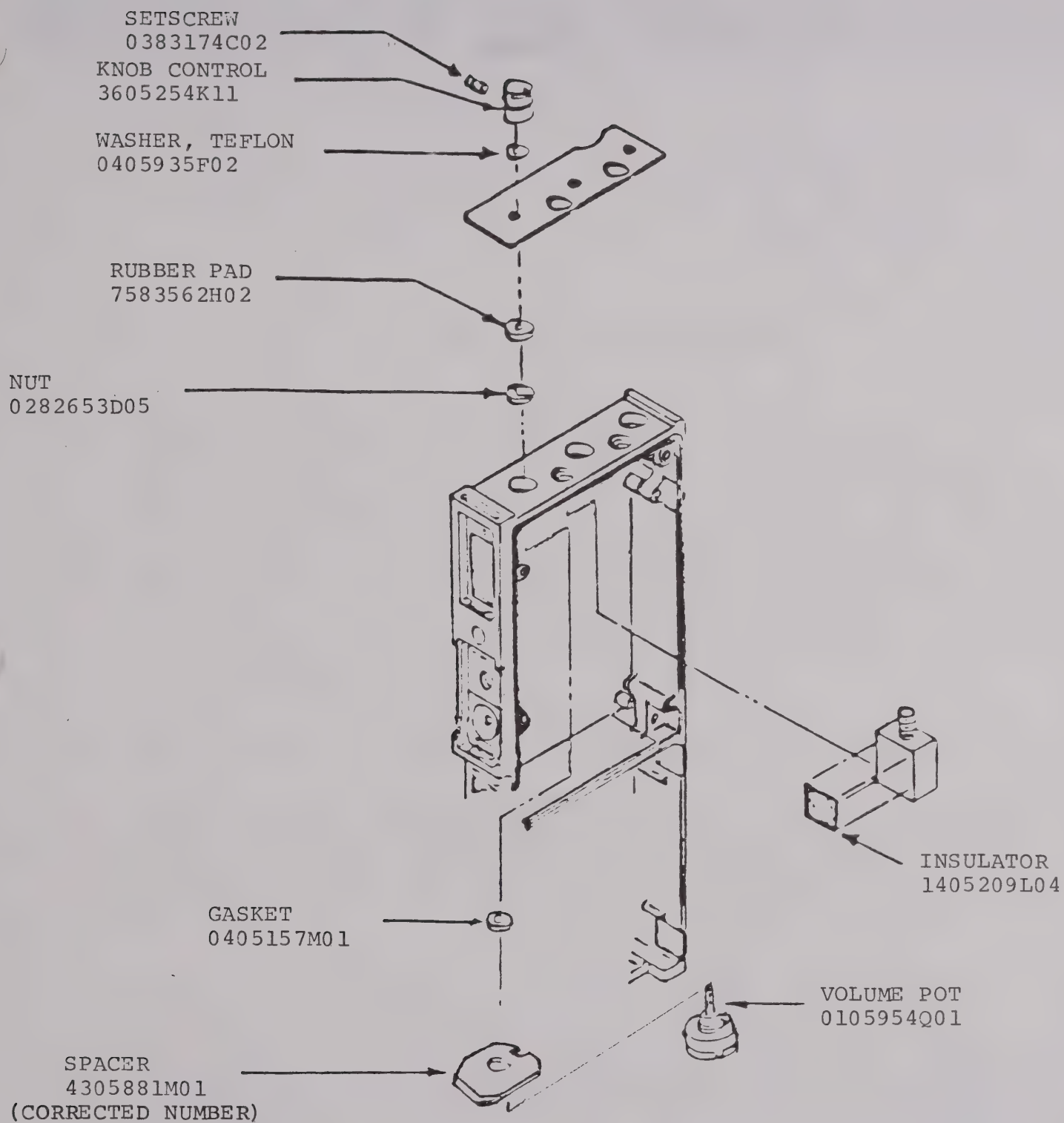


Figure 1





# bulletin

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**PORTABLE PRODUCTS**  
**SRN-1066**  
**APC-749, 751**  
**JANUARY 1989**

## **MT1000 UPGRADE KIT REX-4062A**

MT1000 "A" VERSION PORTABLES CAN BE UPGRADED TO ALLOW THE ADDITIONAL OPTIONS OF THE "B" PORTABLE; IE, FIXED PRIORITY/ HOME CHANNEL ON SCAN, DISABLE TALK-BACK, GROUP CALL, ETC. ALSO MDC SIGNALLING CAPABILITIES CAN BE ADDED TO THE PORTABLE WITH THIS UPGRADE AND THE ADDITION OF A MDC FRONT COVER. THIS MODIFICATION WILL ALSO ALLOW THE PORTABLE TO BE COMPATIBLE WITH THE "ENHANCED" MVA, MODEL NTN1050A. MT1000 "A" VERSION RADIOS WERE SHIPPED UNTIL THE END OF NOVEMBER 1988 AND CAN BE RECOGNIZED BY THE MODEL NUMBER. IE: HxxGC\_xxxxAN .

### **NOTE: THIS WILL NOT CHANGE THE RADIO'S SUB-BAND LIMITATION**

MODIFICATION KIT **REX-4062A** CAN BE OBTAINED FROM C & E PARTS FOR A NOMINAL COST AND CAN BE INSTALLED BY YOUR LOCAL SERVICE FACILITY. CONTACT YOUR LOCAL SERVICE REPRESENTATIVE FOR INSTALLATION CHARGES.

THIS SRN IS FOR INFORMATION ONLY AND NO WARRANTY PARTS NOR LABOR IS OFFERED.

PAGE 1 OF 1

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.



# bulletin

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**PORTABLE PRODUCTS****SRN - 1067****APC-627****MAY 20, 1989**

## **INTERMITTENT LOW OR NO POWER OUT N1325A MXR VEHICULAR ADAPTER**

The MXR Vehicular Adapter shipped prior to May 1, 1989 may exhibit an intermittent problem of low power or no power out. The cause has been traced to the audio pin (part number 45-5740D01) located on the connector block P7, see attached exploded view.

A new pin has been designed and should be changed whenever the vehicular adapter comes in for service or a periodic maintenance (PM) check.

To replace the pin, simply grasp the old one with a pair of needle nose pliers and pull out. Reverse the process and push the replacement pin into the connector. Thoroughly test the adapter to all factory specifications.

To determine if the Vehicular Adapter was shipped prior to May 1, 1989, refer to the fifth and sixth digit of the serial number located on the model plate. If the fifth digit is A through N the adapter was shipped before January 1, 1989. If the fifth is a P and the sixth digit is A through J, the adapter was shipped before May 1, 1989.

The replacement pin (part number 45-5221U01) is available through the C&E Parts Depot free of charge by referencing this SRN.

No labor warranty is intended or implied.

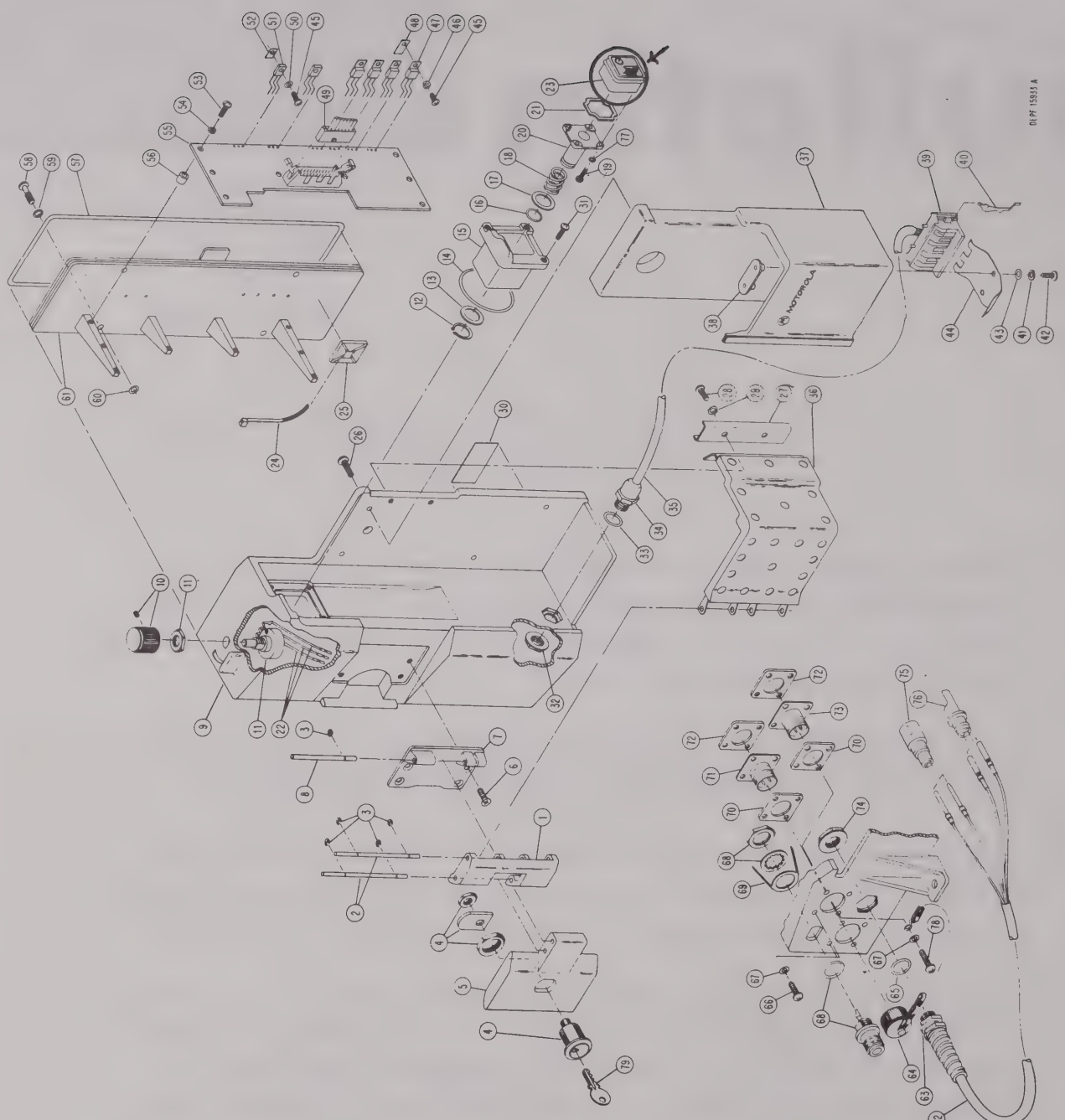
Page 1 of 2

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ITEM NO.	MOTOROLA PART NO.	NOMENCLATURE
1	4705789N01	PIVOT, Latch
2	2205785N01	PIN, Latch
3	4205463E04	RING, E-Type
4	5505179P01	LOCK, Latch
5	4705790N01	HANDLE, Latch
6	0300140351	SCREW, Flat Hd Ph; 4-40 x 3/16"
7	6405784N01	BASE, Latch
8	2205785N02	PIN, Latch
9	1505791N01	HOUSING
10	3605359P01	KNOB, Volume
11	See Note	POTENTIOMETER, Volume (R9)
12	4205312P01	RING, Retaining
13	0405271P01	WASHER, Flat
14	3205082E55	O-RING, Side Connector
15	1505787N01	HOUSING, Side Connector
16	3205082E56	O-RING, Post
17	0405271P01	WASHER, Flat
18	4105277P01	SPRING, Compress
19	0300138542	SCREW, SST Pass; 2-56 x 3/8"
20	4705782N01	POST, Side Connector
21	3205313P01	GASKET, Post
22	See Note	WIRES, Crimped
23	See Note	CONNECTOR, Side Block (P7)
24	4210217A02	STRAP, Tie
25	4205565D01	CLIP, Cable
26	0300140350	SCREW, SST Blk Nkl; 6-32 x 3/8"
27	0705411P01	SUPPORT BAR
28	0305925A01	SCREW, Blk Ox; 10-32 x 1/2"
29	0400400368	LOCKWASHER, Split #10
30	3305314P01	NAMEPLATE, Model Number
31	0300140356	SCREW, Mach Pan Hd Ph; 4-40 x 3/16"
32	0205289P01	NUT, Locking
33	3205082E53	O-RING, Cable Seal
34	3205181P01	SEAL, Cable
35	See Note	CABLE, Battery, Crimped
36	0105957K13	STRAP ASSEMBLY
37	1505793N01	HOLDER, Radio
38	6405575M01	PLATE, Nut
39	See Note	PLATE, Charger
40	See Note	CONTACT, Charger
41	0400009777	LOCKWASHER, #4
42	0300140011	SCREW, SST Pass; 4-40 x 1/2"
43	0400490744	WASHER, Flat
44	4105361P01	SPRING, Battery
45	0300134284	SCREW, Ph Tap; 4-40 x 3/16"
46	0400009777	LOCKWASHER, #4
47	See Note	TRANSISTOR (Q24-27)
48	See Note	INSULATOR
49	See Note	HEADER, Connector (P6)
50	0410059A40	WASHER, Compression
51	See Note	TRANSISTOR (Q1, 2)
52	0405825C01	WASHER, Insulator
53	0300139819	SCREW, 4-40 Unc. x 1/2", Ph
54	0400009777	LOCKWASHER, #4
55	See Note	BOARD, Circuit
56	4382377B64	SPACER, PC Board
57	3205517M09	GASKET, Rectangular
58	0305325P01	SCREW, Captive
59	3205472P03	O-RING, Heatsink Mounting
60	0410058A73	WASHER, Retaining Heatsink
61	See Note	HEATSINK
62	See Note	CABLE, Power Speaker
63	3205181P02	SEAL, Cable
64	3805193P01	CAP, Connector
65	3205082E54	O-RING, Cable Seal
66	0382210E13	SCREW, SST Blk Ox; 4-40 (Conn) (7 req'd)
67	0400140358	WASHER, Flat Blk Nickel
68	See Note	RF CONN, Box Mount (J1)
69	See Note	LUG, Ground
70	See Note	GASKET, Box Mount
71	3205191P01	CONNECTOR, Box Mount (J2)
72	6405354P01	PLATE, Nut, Connector
73	See Note	CONNECTOR, Box Mount (J3)
74	0205289P02	NUT, Locking
75	See Note	CONNECTOR, Receptacle (J5)
76	See Note	CONNECTOR, Plug (P4)
77	0400115361	LOCKWASHER, Split #2
78	0382210E15	SCREW, SST Blk Ox; 4-40 (1 req'd)
79	5505179P02	Key, Lock



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**MOTOROLA**

Communications and Electronics Inc.

A Subsidiary of Motorola, Inc.  
1301 East Algonquin Rd. Schaumburg, Illinois 60196

# bulletin

SRN-1068  
June, 1989  
APC-273, 373  
Deadline Date: 6/1/90**SUBJECT:** *Spectra-TAC* COMPARATOR ENHANCEMENTS

The following information encompasses three different enhancements which should be made to *Spectra-TAC* comparators and one enhancement for the *Spectra-TAC* receiver/base station to provide improved performance. Each enhancement is standalone, i.e., it is not dependent upon the other three for the equipment to operate.

**NOTE**

Please contact the Motorola Communications Parts Division for disbursement of material. Parts are available at no charge by referencing this SRN bulletin until 6-1-90.

**I. *Spectra-TAC* COMMAND MODULE CURRENT SOURCE IMPROVEMENT****Models Affected:** All T1786/87/88 Comparators**Module Affected:** TRN6093A Command Module**Purpose:**

The purpose of this modification is to implement corrective action to prevent a "NO VOTE" condition in system applications which utilize three or more Signal Quality Modules per comparator.

This modification provides an automatically varying current source which insures that sufficient current is present to allow a "Vote" condition to occur when an unsquelch condition is present.

**Modification:**

This modification requires the addition of an 0106729B14 subassembly Auxiliary Current Source kit on to the Command Module. Manual reference is 68P06907F21 (1S-SP3730907).

(OVER)

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.

\*Net User Price — For domestic use only and subject to change without notice.



### Implementation Procedure:

1. Remove the ac/dc power from the comparator to be modified.
2. Remove the command module from the card cage.
3. Remove the tie strap from the wires near the front panel.
4. Remove the front panel assembly from the PC board (3 screws).
5. Remove the locknut and the mounting nut which holds the "LINE-LEVEL" control to the front panel.
6. Insert the "LINE-LEVEL" control through the auxiliary current source mounting bracket and reassemble to the front panel.
7. Reassemble the front panel to the PC board.
8. Carefully cut the 3 leads of transistor Q15 on the main module circuit board as close to the PC board as possible. Discard this transistor.
9. Strip approximately 1/4 inch of insulation from the remaining 4 wires (red, black, orange and white).
10. Clear the solder away from the PC board card edge receptacle mounting holes at pins 1, 8, 12 and 15.
11. Insert the stripped end of the wires into the holes as cleared in Step 10 as follows:

Black	Pin 1
Orange	Pin 8
Red	Pin 12
White	Pin 15
12. Solder these 4 wires in place and trim off the excess wire protruding through the holes.
13. Replace the command module into the comparator chassis. No adjustments are necessary.
14. Reapply the ac power to the comparator chassis.
15. Check to insure that the comparator is still voting properly. Check the audio output level to insure that it was not accidentally moved during the modification. This completes this modification.

### NOTE

This modification does not involve the audio path and should have no effect on the audio level.





## II. *Spectra-TAC* SQM FAILURE LOCKOUT

**Module Affected:** TLN1718B Signal Quality Module (SQM)

### **Purpose:**

The purpose of this modification is to implement corrective action to prevent a failed comparator input path (SQM) from interfering with the operations of the system.

Upon loss of activity the SQM Activity Timer is activated. If no activity is detected within 10 milliseconds, the Line Failure Timer is activated. The Line Failure Timer is set for 15 seconds (1 minute via optional jumpering). During this time period the comparator is locked to this failed input channel and no other audio is passed by the comparator. Upon Line Failure time out, that SQM channel is automatically removed from the voting process and the comparator operates normally, minus the one channel.

Any activity (noise or signal) on this channel will cause the time out process to be repeated thus causing a potential source of interruption to the system.

### **Modification:**

This modification implements a single diode which will hold a failed channel SQM inoperative until that channel is restored to normal operation by the application of 2175 Hz status tone from the receiver.

### **Implementation:**

This modification consists of the addition of a general purpose silicon diode, Motorola part no. 4883654H01. The Anode of the diode should be attached to IC U1 pin 2 and the Cathode should be connected to IC U3 pin 5. See attached Figures 1 and 2 for location/implementation details.

## III. *Spectra-TAC* COMPARATOR DOWN VOTING

**Module Affected:** TLN1718B Signal Quality Modules shipped prior to July, 1988.

### **Purpose:**

The purpose of this modification is to prevent damage to transistor Q18.

If transistor Q18 is damaged in a SQM, that particular SQM will, without exception, vote initially when it becomes unsquelched (i.e., removal of 2175 Hz status tone) regardless of the quality of the signal present. The effect is sometimes noted when it appears that the comparator votes or selects a poorer quality signal than that which was present previously.



## Modification:

This modification requires that resistor R202, 120 ohm, be replaced with a 470 ohm, 1/4 watt, 5% unit, Motorola part number 0611009C41. This modification also requires that a 120 ohm, 1/4 watt, 5% resistor, Motorola part number 0611009C27 be added in series with capacitor C70. Unsolder the negative end of C70 and lift it from the board. Solder one end of the resistor in the hole C70 was removed from. Solder the free end of the resistor and the free end of C70 together keeping the lead length as short as practical. Check the condition of Q18 at this time. With status tone present at the input to the SQM, a dc voltage level of approximately 13.2 volts should be present at pin 18 on the backplane position of the SQM, with NO input to the SQM pin 18 should indicate a level of approximately 2.6 volts dc. If these voltage levels are not present, replace Q18 and retest.

## IV. *Spectra-TAC* RECEIVER MODIFICATIONS

This document outlines modifications to improve the effectiveness of the equalization network in Receivers used in *Spectra-TAC* voting systems.

### a. *Spectra-TAC* Satellite Receivers

1. Obtain these parts for each receiver to be modified.
  - one 1k 1/4 W 5% resistor (Motorola part number 0611009C49)
  - one 50k variable resistor (Motorola part number 1884944C13)
2. Remove the Audio Control Module from receiver.
  - TRN6956A in 800 MHz Receivers
  - TRN6080B in all other Receivers
3. Refer to Figure 3, schematic diagram and circuit board detail.
  - Replace R53 with the 1k resistor.
  - Modify variable resistor as shown in attached circuit board detail.
  - Replace L3 with the modified variable resistor.
4. Move the Green Equalization Jumper to the 9 dB position.
5. Set the adjuster on the variable resistor such that the tip of the arrow points toward the cut off lead. (Maximum clockwise position.)
6. Reinsert the Line Driver in the receiver.

### b. *Micor* or *MSR 2000* Station Receivers with *Spectra-TAC* Option

1. Obtain these parts for each station to be modified.
  - one 1k 1/4 W 5% resistor (Motorola part number 0611009C49)
  - one 50k variable resistor (Motorola part number 1884944C13)
2. Remove the Line Driver from station.
  - TRN6555A in *Micor* Stations
  - TRN5294A in *MSR 2000* Stations





3. Refer to Figure 4, schematic diagram and circuit board detail.
  - Replace R55 with the 1k resistor.
  - Modify variable resistor as shown in attached circuit board detail.
  - Replace L2 with the variable resistor.
4. Move the green Equalization Jumper to the 9 dB position.
5. Set the adjuster on the variable resistor such that the tip of the arrow points toward the cut off lead. (Maximum counterclockwise position.)
6. Reinsert the Line Driver in the station.

c. **MSP 5000 Station Receivers with *Spectra-TAC* Option**

1. Obtain these parts for each station to be modified.
  - one 3.9k 1/4 W 5% resistor (Motorola part number 0611009C63)
  - one 16k 1/4 W 5% resistor (Motorola part number 0611009C78)
  - one 1000 pF 5% capacitor (Motorola part number 0811017A01)
2. Remove the TRN9044A *Spectra-TAC* Board from the station.
3. Refer to Figures 5 and 6, schematic diagram and circuit board detail.
  - Replace R1855 with the 3.9k resistor.
  - Replace R1857 with the 16k resistor.
  - Replace C1817 with the 1000 pF capacitor.
4. Reinstall the TRN9044A *Spectra-TAC* Board in the station.

d. ***Spectra-TAC* Set Up Procedure**

This document outlines the correct procedure for setting up a *Spectra-TAC* Voting system. The equalization networks in all the receivers or stations must be modified as described in the "*Spectra-TAC* RECEIVER MODIFICATIONS" document.

Use this procedure instead of the procedure in any of the receiver or station manuals.

The following explanations of the issues involved in setting up a *Spectra-TAC* voting system are included to emphasize the importance of each step in the procedure.

1. **Path Equalization**

The frequency response of the audio paths between the receivers and the comparator must be equalized to assure that the voting process is dependent on the signal quality from the receiver and not the frequency responses of the audio paths.



## 2. Line and Status Tone Level Adjustments

The line level settings must be made accurately and consistently; first to assure that the voting process is dependent on the signals from the receivers and not variations in the level settings, secondly to assure that the system audio level will not vary as the comparator switches from receiver to receiver and thirdly to assure that the maximum line levels allowed by the phone company are not exceeded.

The phone company specifies the maximum level allowed on a phone line. In addition, for voice quality lines, the phone company may specify the maximum allowable power level. This is done to minimize cross talk and equipment overloading. The maximum power level is determined by the average signal level over a 3-second period. Due to the pauses between syllables and words, the 3-second average, in most cases, will be 13 dB below peak level. However, in 2-way FM systems, with deviation limiting, the average level may be only 4 dB below peak level. Phone company line level specs commonly limit the peak voice level to 0 dBm and continuous tones to -13 dBm. Further, phone company specs for 2-way applications commonly limit a 1 kHz test tone at fully system deviation ( $\pm 5$  kHz) to -4 dBm.

In systems which utilize microwave paths instead of phone lines, insure that the microwave system has been properly level set and then refer to the applicable system level setting documents.

The recommended level setting procedure for Motorola Trunking systems is to adjust the receiver line output level, using a test tone of 1 kHz and deviated 3.0 kHz. The line output level into the microwave multiplex termination card should be adjusted to -10.0 dBm. The termination card input attenuator should be jumpered to provide 20 dB loss. Status tone should then be adjusted to -19.0 dBm. At the receive end of the microwave link, the termination card should be jumpered to provide 3 dB of loss. The receive end levels should then equal the transmit end input levels of -10.0 dBm and -19.0 dBm.

## 3. Squelch Adjustments

The receiver squelch control should be set at 20 dB quieting. The SQMs are not designed to operate below 20 dBq and the squelch setting of the receivers is important for proper system operation. If the system is designed with adequate coverage, there should be no reason to set any receiver squelch below 20 dBq.





## PROCEDURE

### NOTE

This procedure requires a technician at both the comparator and receiver sites.

This procedure must be performed at each receiver site.

#### a. Path Equalization

Step 1. Any receiver that is collocated with the comparator or has an audio path with significant frequency response beyond 3500 Hz must use a QRN8498A Low Pass Filter Module in the comparator (also available as option C366ADSP). This module requires one SQM position in the comparator chassis.

Step 2. Turn the Status Tone Encoder TONE LEVEL control fully counterclockwise.

Step 3. Using an audio generator inject a 0.1 volt tone into the input point indicated below.

The generator output level must remain constant from 400 Hz to 4000 Hz.

Satellite Receiver: Pin 23 on the Audio Control Module.

Micor and MSR 2000: J1-Pin 5 on the Line Driver Module.

MSF 5000:      Capacitively couple to TP-3 on Spectra-TAC Board.  
                 Turn INTERCOM switch "ON"  
                 Set LOC PTT on Mus Bus (Address 1-Bit 1)

Step 4. Adjust the audio generator's frequency to 1000 Hz. Set the LINE LEVEL control for a LINE output level of -10 dBm. Record the level this produces at the corresponding SQM input of the comparator.

Step 5. Adjust the audio generator's frequency to 3000 Hz. Adjust the "HI FREQ EQ" control (this is the 50k potentiometer added during modification), for a level equal to that recorded in Step 4 at the SQM input of the comparator.

Step 6. Repeat Steps 4 and 5 until the level difference between 1 kHz and 3 kHz is less than 1 dB. The 1 kHz level reference must remain at -10 dBm.

Step 7. Adjust the audio generator's frequency to 400 Hz. Adjust the "LO FREQ EQ" jumper (ORG) or control for a level at the corresponding SQM input of the comparator within 3 dB of the level recorded in Step 4. Keep in mind that the lo frequency equalization effects the "sound quality" of the voted audio, but does not effect the voting process itself.

Step 8. Remove the Audio Generator.



## **b. Line Level Adjustment**

### **NOTE**

Line equalization must precede line level adjustments.

Step 1. "PL" Disable the receiver (if applicable).

Step 2. Inject a 1.0 millivolt carrier frequency signal at the antenna input of the receiver.

Step 3. Modulate the carrier with a 1000 Hz tone at  $\pm 5$  kHz deviation ( $\pm 3.0$  kHz for Trunked systems).

Step 4. Set the LINE LEVEL control for the desired LINE output level. (In Trunked systems, set the LINE LEVEL control for -10.0 dBm.)

Step 5. Record the level this produces at the corresponding input of the comparator. (In Trunked systems this should be equal to the LINE LEVEL.)

## **c. Squelch Adjustment**

Step 1. Disconnect any rf input to the receiver.

Step 2. Turn the SQUELCH control fully counterclockwise and "PL" disable receiver. (As applicable.)

Step 3. Record the noise voltage level at the LINE output.

Step 4. Inject a low level unmodulated carrier frequency signal at the antenna input of the receiver.

Step 5. Increase the signal level until the LINE output voltage is reduced by 20 dB, i.e., one tenth of the level in Step 3. This is the 20 dB quieting point.

Step 6. Turn the SQUELCH control clockwise until the receiver just squelches.

Step 7. "PL" enable the receiver. (If applicable.)

## **d. Status Tone Adjustment**

Step 1. Disconnect any rf input to the receiver.

Step 2. Adjust the TONE LEVEL control until the status tone level at the corresponding input of the comparator is 13 dB below the level recorded in "Line Level Adjustment" Step 5.

For Trunked systems Status Tone should be set to 9 dB below the level recorded in Step 5.

Step 3. Reconnect receiver antenna and re-enable transmitter if necessary.





## V. TIME AUTHORIZATION

### Items 1, 2, and 3:

Labor not to exceed one hour by an authorized Motorola Shop plus travel time can be charged to warranty using the standard warranty procedure and referencing this SRN bulletin number. We suggest that these modifications be implemented during routine maintenance.

### Item 4:

Labor not to exceed one hour per site per channel per man plus travel time to the site can be charged to warranty using the standard warranty procedure and referencing this SRN bulletin number.

### Example:

Five (5) *Spectra-TAC* receivers/base stations at a site equals five (5) hours at the station site plus five hours at the comparator site, total ten (10) hours plus travel time to the site.

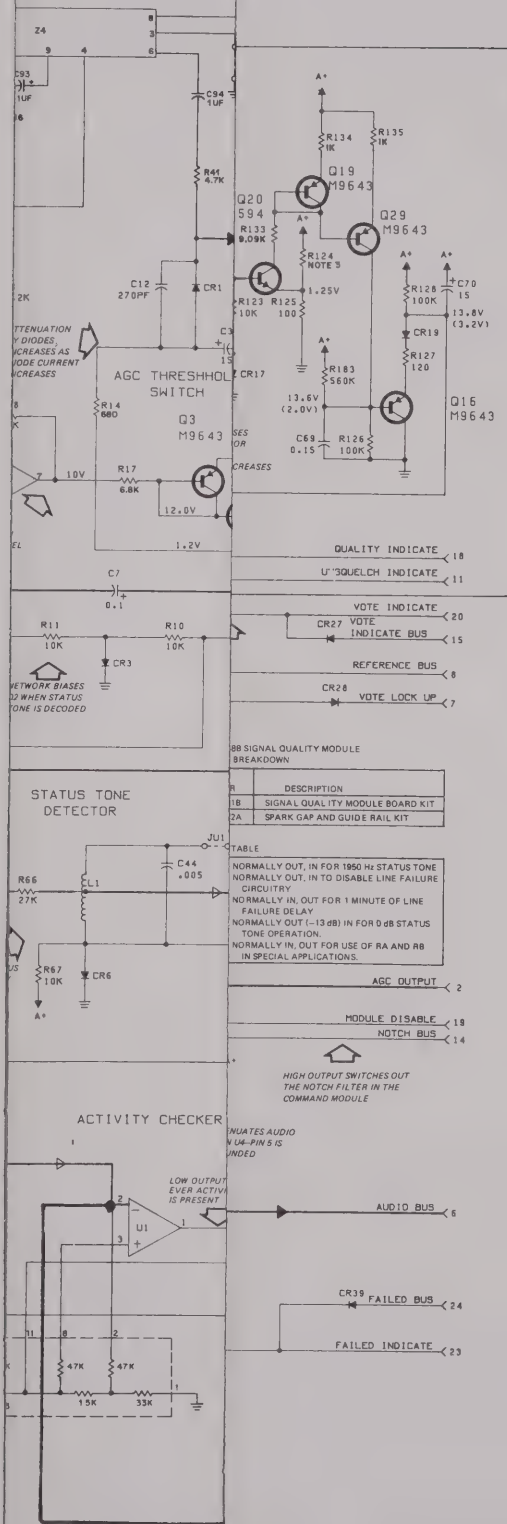
### Parts Required

<u>Motorola Part No.</u>	<u>Description</u>	<u>*User Price</u>
0106729B14	Auxiliary Current Source	\$76.00 each
4883654H01	Silicon Diode	.85 each
0611009C41	Resistor, 470 ohm, $\pm 5\%$ ; 1/4 W	1.20 pk/10
0611009C27	Resistor, 120 ohm; $\pm 5\%$ ; 1/4 W	1.20 pk/10
0611009C49	Resistor, 1k $\pm 5\%$ ; 1/4 W	1.20 pk/10
1884944C13	Resistor, 50k, variable $\pm 20\%$ ; 0.1 W	1.90 pk/5
0611009C63	Resistor, 3.9k $\pm 5\%$ ; 1/4 W	1.20 pk/10
0611009C78	Resistor, 16k $\pm 5\%$ ; 1/4 W	1.20 pk/10
0811017A01	Capacitor, fixed; 1000 pF $\pm 5\%$ ; 50 V	1.55 pk/10



# SIGNAL QUALITY MODULE

MODEL TLN1718B



## FUNCTION

Determines noise level of signal and compares it to noise level measured on other receiver lines. Routes receiver audio to the command module when the receiver is voted. Detects failure of the receiver line.

Figures 1 and 2. Modifications to TLN1718B Signal Quality Module

68P81033E03-E  
5/30/80-NPC

EPS-47134-O

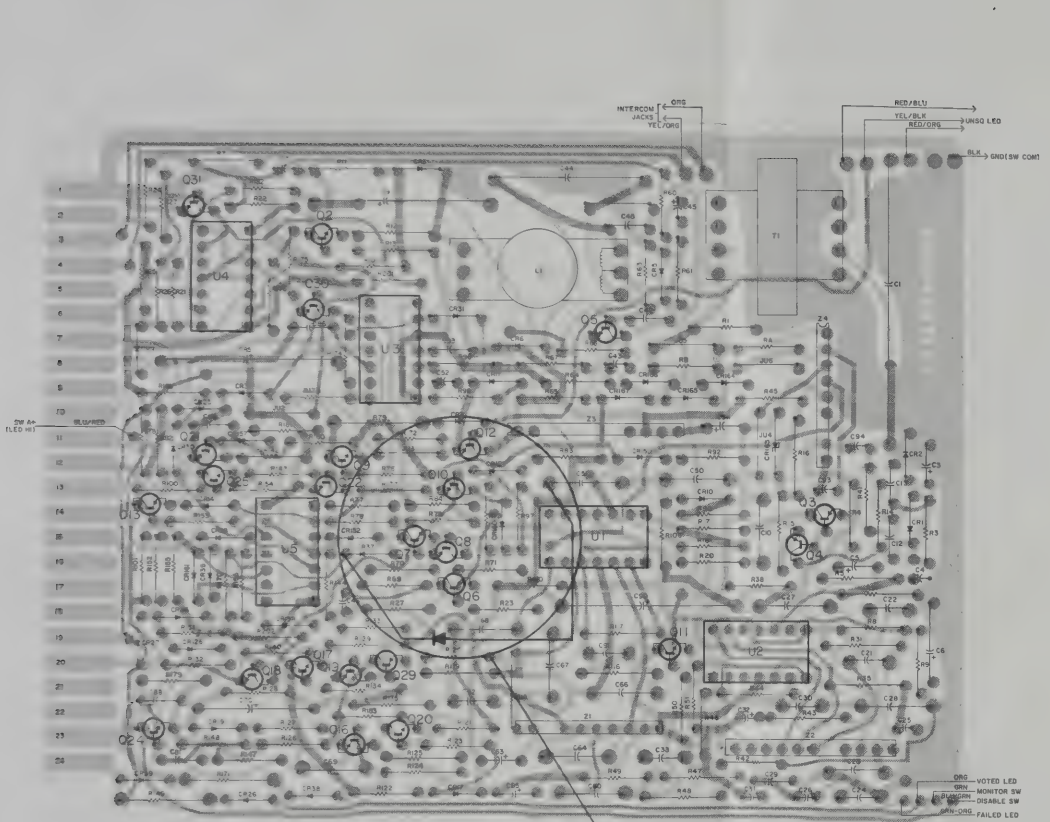
SIGNAL QUALITY MODULE





# SIGNAL QUALITY MODULE

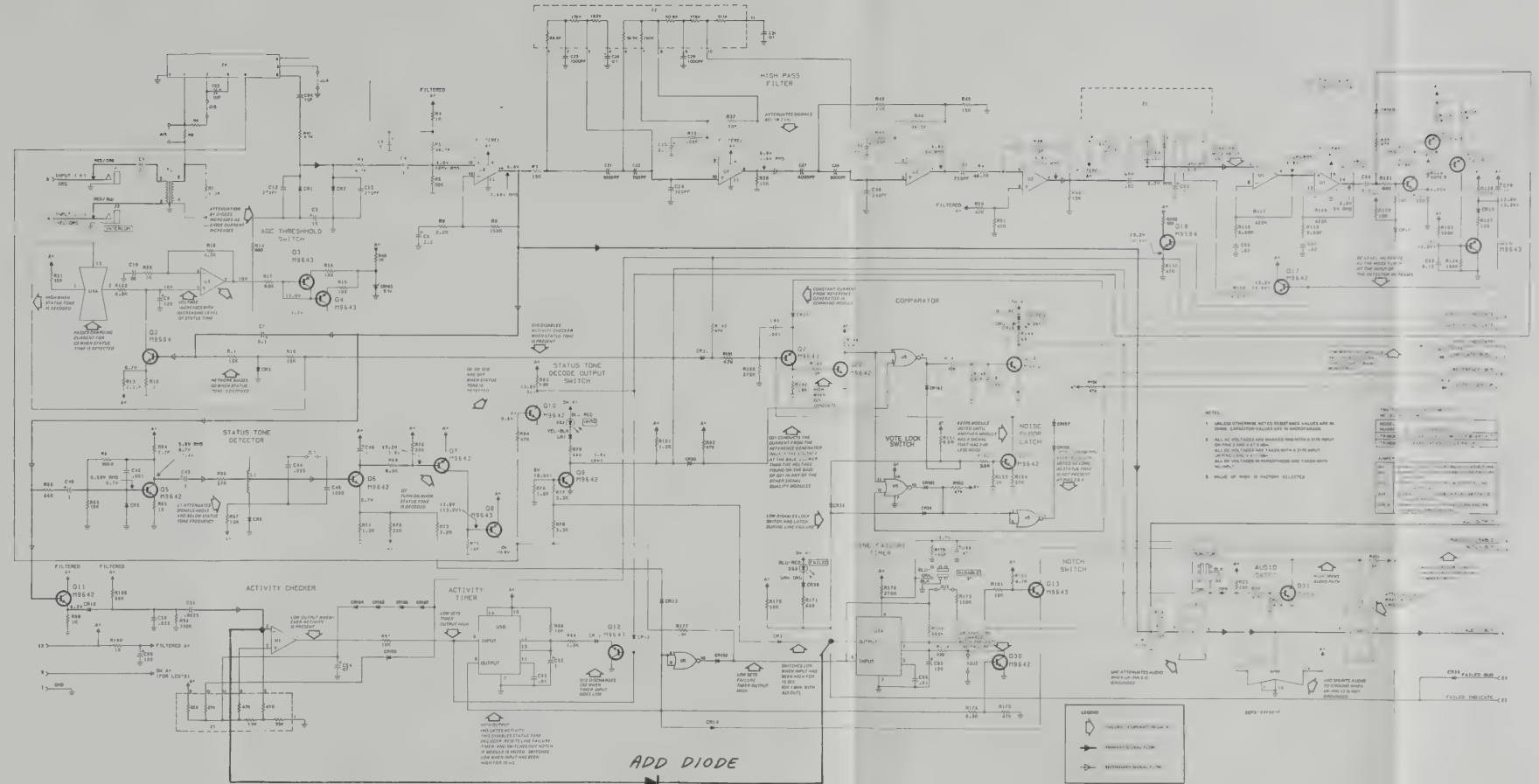
MODEL TLN1718B



SHOWN FROM SOLDER SIDE

COMPONENT SIDE: 80-DEPS-22105-B  
SOLDER SIDE: 80-DEPS-22106-B  
DL-DEPS-22106-C

ADD DIODE  
FIGURE 1



ADD DIODE  
FIGURE 2

## FUNCTION

Determines noise level of signal and compares it to noise level measured on other receiver lines. Routes receiver audio to the command module when the receiver is voted. Detects failure of the receiver line.

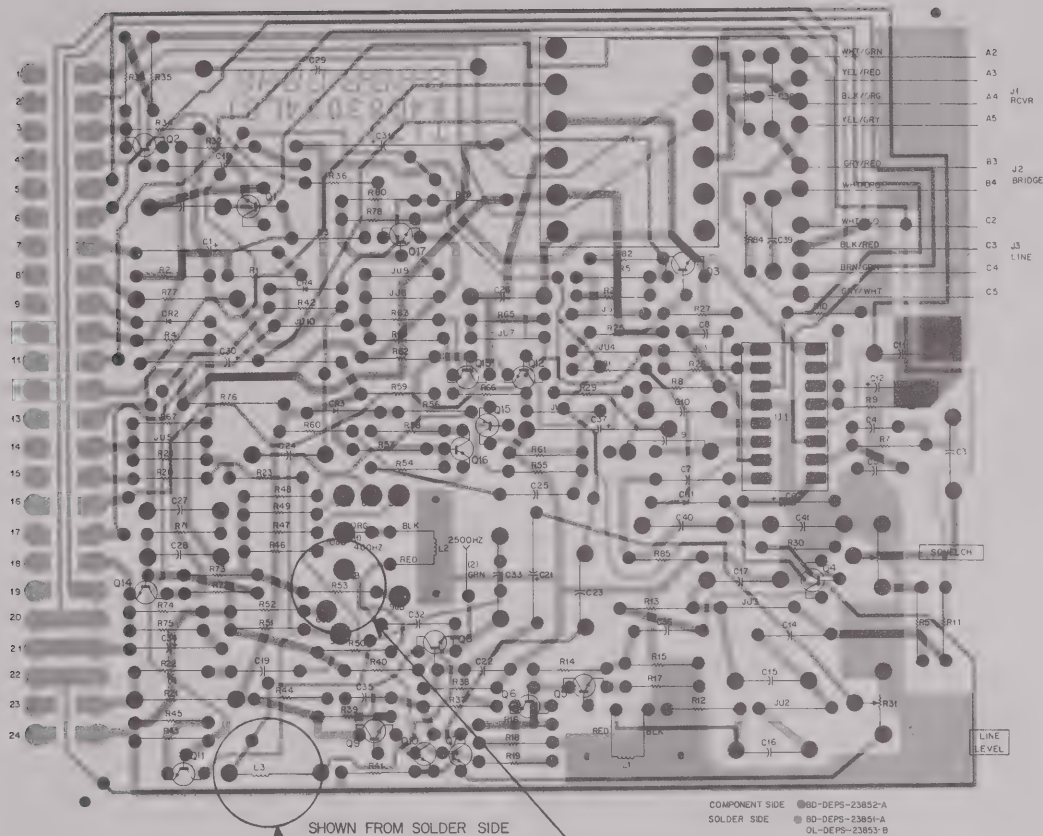
Figures 1 and 2. Modifications to  
TLN1718B Signal Quality Module

68P81033E03-E  
5/30/80-NPC

EPS-47134-O

SIGNAL QUALITY MODULE





REMOVE L3 AND ADD  
50K POT. CUT OFF  
LEAD NOT USED.

REPLACE R53, 11K,  
WITH 1K RESISTOR

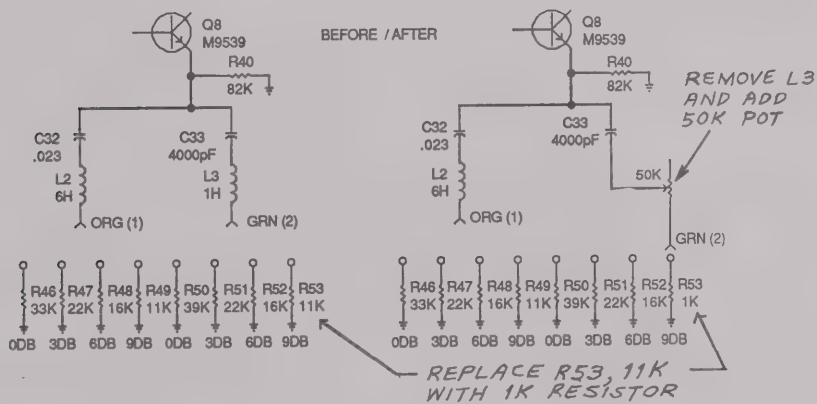


Figure 3. Modifications to Spectra-TAC Receiver Audio Control Module





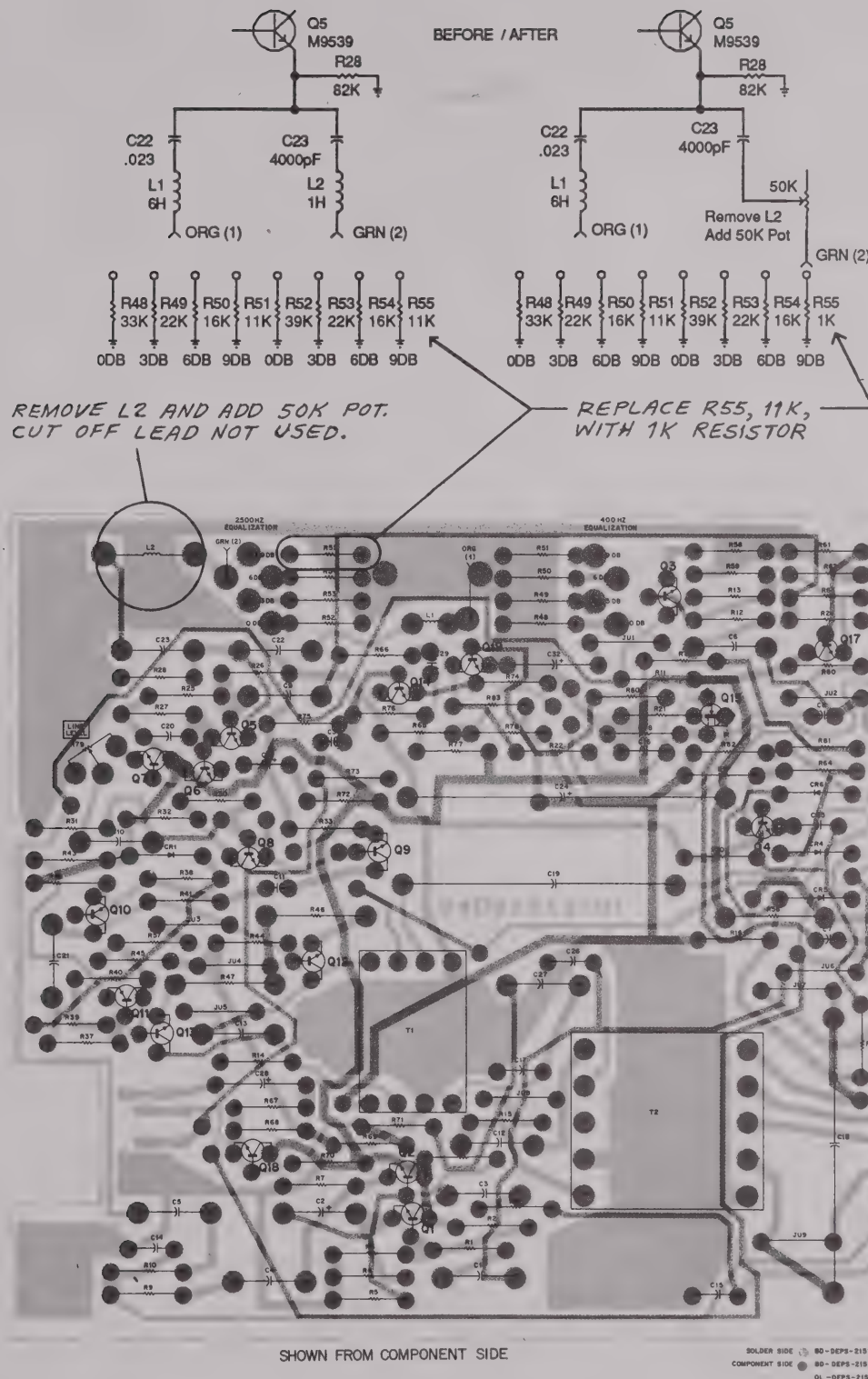


Figure 4. Modifications to Micor or  
MSR 2000 Spectra-TAC Line Driver Module



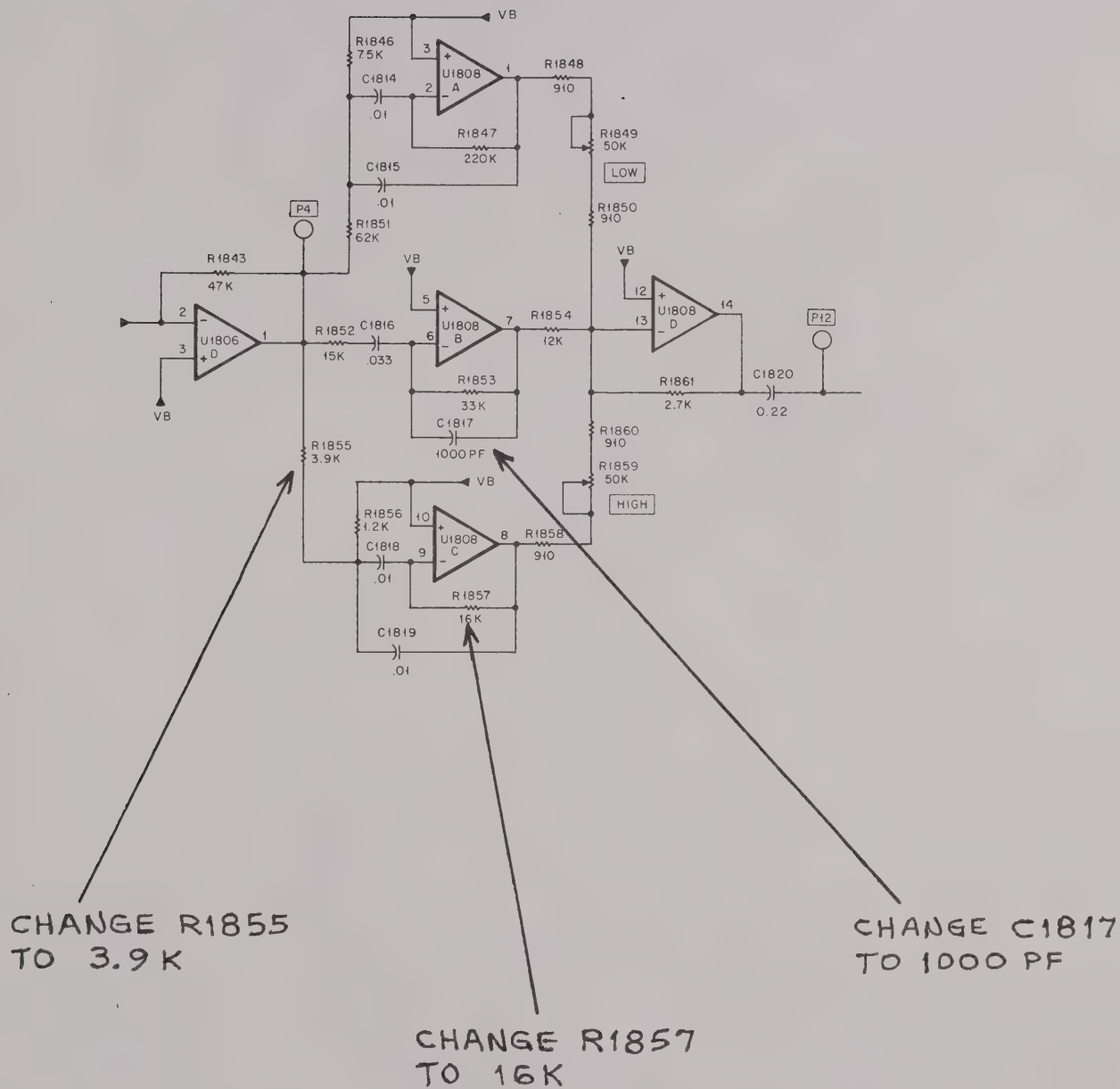


Figure 5. Modifications to MSF 5000  
Spectra-TAC Encoder Board





CHANGE R1855-  
TO 3.9K

CHANGE C1817  
TO 1000PF



SOLDER SIDE ● BD-EPS-37996-0  
COMPONENT SIDE ● BD-EPS-37997-0  
OL-EPS-37998-0

EPS-47138-O





# bulletin

**MOTOROLA**

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**PORTABLE PRODUCTS****SRN- 1069****APC- 749, 751****JULY 7, 1989****MT1000 FRONT COVER FLEX RETENTION PAD**

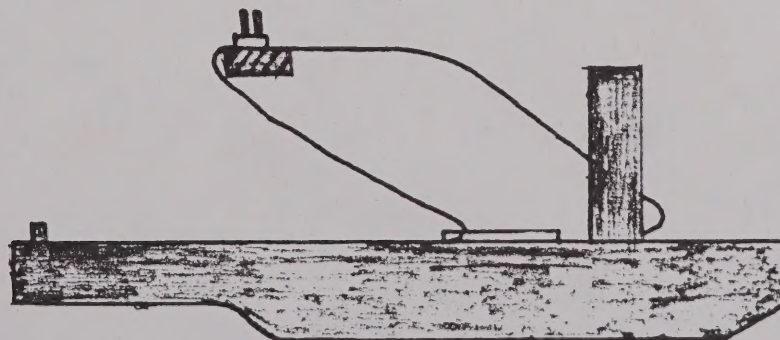
PORTABLES SHIPPED WITHIN THE PAST FEW MONTHS CONTAIN AN ADDITIONAL PART (7505501R04/PAD) TO THE FRONT COVER FLEX ASSEMBLY. THIS PAD MAXIMIZES RETENTION BETWEEN CONNECTORS P5 AND J5 DURING ASSEMBLY.

DURING ROUTINE MAINTENANCE OR SERVICE, INSPECT THE FRONT COVER FLEX FOR (7505501R04/PAD) THIS ADDITIONAL PART. MT 1000 PORTABLES WITH THE EXCEPTION OF RADIOS WITH FRONT COVERS; NTN5456, NTN5457, NTN5458 AND NTN5459 SHOULD HAVE THIS PAD.

THIS RETENTION PAD IS PLACED ON THE SOLDER SIDE OF P5 BETWEEN THE FLEX END LOOP. (SEE FIGURE 1)

THIS PART WILL BE AVAILABLE THROUGH MOTOROLA C & E PARTS AT NO COST WHEN REFERENCING THIS SRN.

THIS SRN IS FOR PARTS ONLY AND NO LABOR WARRANTY IS OFFERED.

**FIGURE 1**

If applicable, enter this information or note this bulletin number and subject material in the appropriate equipment instruction manuals and make necessary schematic diagram changes.

Enter this bulletin in the correct MASTER and CLASSIFIED INDICES for future reference.



